

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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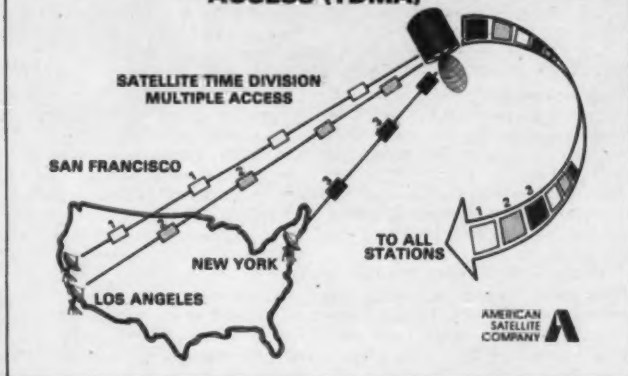
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NEWSPAPER

TIME DIVISION MULTIPLE ACCESS (TDMA)



Amsat Public Network

Amsat unveiled the first satellite network providing all-digital transmission. Story on Page 2.

Hardware a 'Throw-Away' Industry Software Seen Taking the Limelight

By Rory J. O'Connor

Special to CW

CHICAGO — Hardware has become a "throw-away" industry and software has taken over the limelight, according to Larry Welke, president of International Computer Programs,

said. That, coupled with the "explosion" in computer use, has created a group of users "who, five years ago, could never have afforded the mis-

takes that computers introduce into their businesses."

More use by old users, computer use
(Continued on Page 4)

Additional coverage of Software Info appears on Page 4.

Inc. Welke also told the attendees of the opening session of the first annual Software Info show here that software is now "the determining factor in solving information problems."

"If we are going to install 100,000 computers in the next few years, let's make sure we solve 100,000 problems," he urged the audience, admonishing them to recognize that communication progress is changing the way that problems are solved, as well as the nature of the problems themselves.

Welke's speech centered around two points: the software problem as it relates to the programmer and as it relates to the user. Both the huge increases in the number of people using computerized information and in the amount of that information has consequently caused a great increase in the number of people needed in an industry already short of trained personnel, he said.

"People will never give up the information they now have access to," he

said. Software packages that let the DP department off-load routine MIS functions to the end user are tickling the palates of a growing number of computer-using organizations.

What makes such packages appetizing is that they free technical DP staffers to tackle critical jobs and system development. They also lessen an organization's dependence on these skilled professionals who are still in short supply, still expensive and who represent one of the biggest drains on the DP budget.

It is for these reasons that report generators became and remain popular. "DP personnel costs are going up and companies want to make the best use of these resources, such as for writing new systems," commented Kevin Cooper, manager of retrieval systems development for Pansophic Systems, Inc. "Report generation is viewed as less of a critical task and one that companies don't want to tie up their programmers' time with."

Organizations developing an appetite for report generator software can quell

their hunger with a variety of flavors. There are report writer packages that can be installed stand-alone and report

generator facilities that are embedded in data management or data base management systems. In addition, there are a number of file manipulation and inquiry response systems that have powerful report preparation modules associated with them.

Office and Clerical Unions Viewed a Trend for DPer

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — Recent involuntary unionization of DP personnel at Western Airlines, Inc. and Union Pacific Railroad Co. presages increased efforts to bring DPer into existing clerical and office worker unions in those two industries, according to a National Mediation Board (NMB) official.

For purposes of narrowing this broad product category, the charts on Pages 10 and 11 include only packages that fit the following description: Independent

(Continued on Page 12)

"I suspect we will see more and more of it," David Cohen, chief hearing officer of the independent federal agency told *Computerworld* here last week in a discussion of successful attempts by the Brotherhood of Railway and Airline Clerks (Brac) to become representatives of programmers, systems analysts and other high-level DPer at Western and Union Pacific [CW, Aug. 18, 1980].
(Continued on Page 6)

Productivity Linked To 'Knowledge Nuggets'

By John Whitmarsh

CW Staff

PHILADELPHIA — What is causing the productivity crisis in the U.S.?

The root cause, or at least a contributing one, is the "misdirected focus" of top management in its search for solutions, according to Robert M. Price, president of Control Data Corp.

"We look to information as the solution to our problems rather than examining the process and mechanics of management and the role of knowledge assistance systems in that process," Price charged in his keynote address to 350 attendees at the 12th Annual Society for Management Information System (SMIS) Conference here.

More than one million computers are

used in American business today, and they churn out 220 billion pages of information every working day, Price noted. Such volume is both a blessing and a curse.

"On the one hand, American business is inundated with information about itself, its products and its economic environment. On the other hand, business is experiencing stagnation of productivity that threatens its very ability to compete," he said.

'Bring Coherence'

Price called upon his audience of MIS directors and vice-presidents "to bring coherence to this disarray, to halt the disintegration and to address head-on the enormous productivity problems of our society."

The answer, Price suggested, "lies not in the generation of more information, but in nuggets of knowledge. This will require an upshift from the management information systems of today to the computer-aided management of tomorrow."

The man who started at CDC in 1961 as a programmer and who rose to president of the company urged his col-



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All-Digital Transmission

Amsat Unveils Public Satellite Net

By Phil Hirsch

CW Washington Bureau

SAN DIEGO — The first public satellite communications network providing all-digital transmission between entry and exit nodes was unveiled here last week at the Tele-Communications Association (TCA) conference by American Satellite Co. (Amsat). Company officials reported that as a result of the system's higher throughput, they will shortly file a new tariff that offers broadband data communications service at sharply reduced rates.

This increased cost-effectiveness is obtained largely by replacing analog transmission and frequency-based channel allocation techniques with digital transmission and a time-division multiplexing/multiple-access (TDM/TDMA) allocation scheme, the company said.

One result of the change is that Amsat's newly upgraded network can transmit 10 times as much data as its predecessor, explained Dr. Eugene Cacciamani, the company's chief engineer.

In addition, satellite channels can be dynamically shifted from one pair of nodes to another, to accommodate fluctuations in traffic.

Minimum Error Rate

The minimum error rate provided by the system is $1:10^{-7}$, one order of magnitude better than was available before. And through the use of software imbedded within the network, this error rate can be reduced to $1:10^{-12}$.

Another key feature is the system's ability to integrate disparate data streams — such as data, voice, facsimile and video — into a single high-

speed data stream, thus enabling users to consolidate multiple existing networks into a single facility that costs less because it carries more traffic.

Voice signals are converted at the entry node into a 32K-bit digital data stream, half the standard rate. Amsat is thus able to accommodate two voice channels within the bandwidth needed by other networks for a single digital voice channel.

Three of the four nodes in Amsat's present general services network have been upgraded to support digital broad and transmission. The nodes are located in New York, San Francisco and Los Angeles.

Each consists basically of a central office (CO) that terminates local loops from the customer's site, and an earth station that communicates with the satellite. Connecting the central office and earth station are dual microwave channels.

The fourth node in the Amsat general services network, located in Dallas, will be upgraded early next year, the company said.

The first of the lower rates stemming from use of the new technology will encompass a CO to CO 56K-bit service. According to Amsat tariff chief Fred Reyes, this tariff will offer a coast-to-coast 56K-bit full-duplex circuit for \$4,500/mo. End links connecting each CO with the user's premises will cost another \$1,400/mo apiece. The total bill will then be \$7,300/month. By comparison, according to Reyes, AT&T charges \$9,000 to \$10,000 for an equivalent Dataphone Digital Service facility.

The network handles data, voice, facsimile and video signals input in either

digital or analog form. The analog signals, after being digitized, are multiplexed, together with the digital inputs, into an integrated 78M bit/sec, digitally modulated data stream transmitted over the dual microwave channels to the earth station. There, controlled by TDMA software, the bits are shot up to the satellite at a rate of 64M bit/sec.

The satellite downlink, which operates at the same rate, connects with 78M bit/sec terrestrial microwave channels at the receiving earth station; these microwave links terminate at a central office that interfaces with analog or digital facilities leading to a terminal at the receiving end of the transmission path.

Use of TDMA to allocate capacity on the satellite up and down-links permits much more efficient use of the bandwidth, Amsat explained. "In a conventional analog frequency division multiplexed/frequency modulated (FDM/FM) system, it is often necessary to operate several radio carriers through a common [satellite] transponder."

Because extra bandwidth is needed per channel to control distortion and interference, this scheme results in inefficient use of both bandwidth and power, the company added.

Each of Amsat's satellite transponders can support up to 39 asynchronous channels, each operating at 1.544M bit/sec. The maximum channel efficiency under this scheme is 96%, the company said. However, a channel efficiency of up to 99% can be achieved by a mixture of standard T1 (1.544M bit/sec) channels with non-standard data rates.

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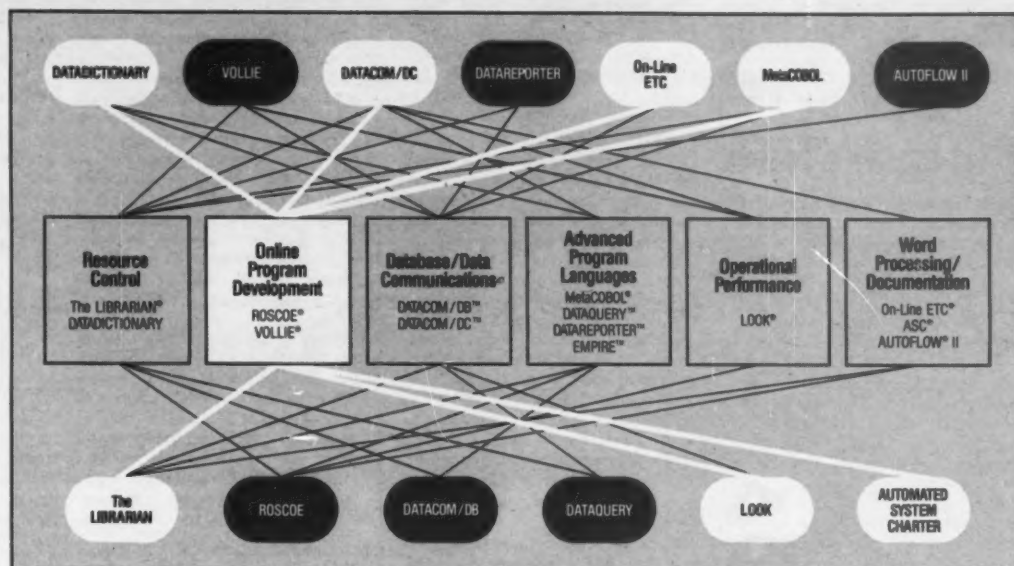
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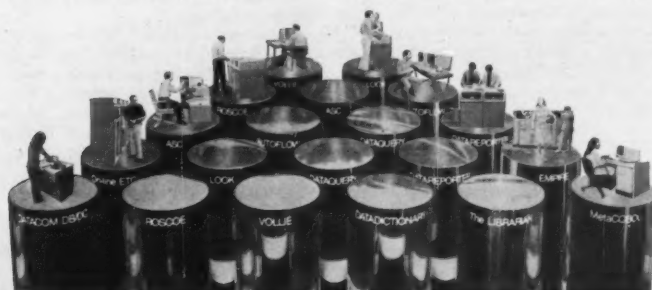


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'Software Revolution' Failure of IBM Packages Viewed a Boost to Industry

By Rory J. O'Connor
Special to CW

CHICAGO — The failure of IBM software packages like IMS have helped give the software industry a needed push, John Imlay, chairman of the board of Management Science, Inc., said during his keynote address at the Software Info show here last week.

CW at Software Info

Stressing the software package as the glue that holds information technology together, Imlay gave the crowd his views of what would be driving the "software revolution" through the 1980s.

Among his predictions are that the case of IBM vs. U.S. will be settled within a year, and IBM will then continue to be a dominating force in the computer industry. He also sees the Japanese attack as another driving force in the U.S. software industry, although not as big as the communications revolution.

"Communications will be the biggest revolution in our industry between now and 1983," Imlay said, citing the development of fiber optics as one of two main reasons. The other will be the increased competition in the satellite business between giant IBM and the newly deregulated AT&T, bringing down the costs involved in long-distance communication.

Chip on a Typewriter

Imlay then described word processing as simply the addition of a "chip to the typewriter," but said that this has created "the terminal for the office of the future. It will force the development of packaged software for office automation," he told the gathering.

He also said that the coordination of office technology would shift soon from the administrator to the DP professional.

Software Viewed As Key To Information Problems

(Continued from Page 1)
by new users and the introduction of computer technology into new areas of commerce have created this wealth of people, he said.

U.S. Lacks 35,000

In contrast, the U.S. is currently short some 35,000 software professionals, he stated. And while some firms respond by attempting to fill the gap with untrained personnel, the shortage will undoubtedly drive the package software market.

When positions are filled, Welke noted, the prospects are likely to be distributed along a curve with the semiskilled at one end, the "bit jockeys" at the other, and the average programmer in the middle. He cautioned that hiring from either end could present problems, since hiring the overachiever "writing palindromic

The personal computing market is another area Imlay warned the audience to watch. Saying that initially the personal computing arena had been viewed as "another model train market," it has since expanded with the influx of computer-assisted instruction, security and personal finance packages, along with the commonly marketed game and entertainment programs. "The electronic home will be a battlefield in the software revolution," Imlay predicted.

Besides specific market areas driving the software boom, the general money crisis has caused an increase in the importance of packaged software. Inflation has spelled trouble for those installations that would otherwise develop in-house packages, with the cost of purchasing remaining much lower than the cost of designing the building.

Imlay predicted that in a few years, it would cost nearly 10 times as much to make as it would to buy, for the average shop. The time needed to develop the package will also increase, he noted. These factors will necessitate the development of productive, profit-making, unique applications, rather than "reinvention of the wheel," he said.

As for the next decade, Imlay predicts that IBM will still be the dominant market force in 1990, with AT&T breathing down its neck. This competition between two huge firms should bring costs down, with the Japanese invasion simply fueling the price wars.

Looking to the near future, though, the two-headed beast of information and energy will remain of primary concern, Imlay believed. He did warn that "we might get ahead of ourselves" in the introduction of technology, and that without a certain amount of caution the vital person-to-person contact in both business and personal life might give way to too much computerization. But that problem is not apparent yet, he stressed; the only certainty is that "the package era is here," Imlay concluded.

code" is as dangerous as hiring the "warm body."

One of the reasons that software has become problematic is that programmers and users have been confused about solutions. "We allowed ourselves to believe that information problems are multisolution, when really it's that there are no rules or standards to programming. The question that's been asked is 'Does it work?' We should really be asking 'Is it right?'" Welke stated.

Package software must thrive, he said, because the cost of error-free code, estimated to be \$100 a line, is simply too expensive for most shops. The pace of technology, as well, is a problem, causing a hardware and software investment to become obsolete in much less time than previously. "By the time your new system is up and running, it's outdated," he said.

Mainframers Dominate Software Show

By Rory J. O'Connor
Special to CW

CHICAGO — There were 80 cautious but seemingly happy vendors on the floor of the Software Info show here last week, most of them in the mainframe marketplace with a small group of mini and micro firms scattered about the hall. And the consensus appeared to be that a "software-only" show has been a long time in coming.

One of the key problems in a show such as this is how to display a product. Without the benefit of the "bell and whistle" hardware at a booth, showing software alone can present a marketing problem. The three most common solutions, used individually or in combination, were hardware running software, audio-visual presentations and the simple table of literature and handouts staffed by a smiling employee.

It might have been more confusing, but the attendees were serious business prospects, according to most vendors polled. "One vendor suggested that it was the price of admission that kept the sightseers away, and suggested that the National Computer Conference might take a cue and cut down on the congestion experienced in recent years.

In keeping with the spirit of an "experimental" show, the number of new products shown was very small. Vendors preferred to use established products to keep a single variable — the show — at the top of the evaluation list. In another fairly conservative move, most vendors refrained from using flashy tactics like mimes, magicians and models to attract people to their booths.

IBM Absent

One of the biggest surprises to many was the absence of IBM from a show largely dedicated to products for that firm's processors. Other industry leaders like Digital Equipment Corp. were also notably absent.

But to many exhibitors that represented a boon — space for the next show in 1981, which many felt would be much larger, will be allocated on a seniority basis, and some of the small firms in attendance will have priority over the large companies not represented.

About 6,000 persons preregistered for the four-day show, which included three days of exhibits and a partially concurrent three-day seminar program. However, no official figures on attendance were released.

'Bill of Rights' Offered To Potential Package Buyers

By Rory J. O'Connor
Special to CW

CHICAGO — A software buyer's "bill of rights" presented by Yourdon, Inc. consultant Louis Mazzucchelli at the Software Info show here prepared potential buyers for some of the pitfalls involved in purchasing packages waiting for them just below on the exhibit floor.

"Be careful," he said, telling the listeners that the horizontal and vertical expansion of the software industry has resulted in something less than "maturity," and that the only smart way to buy was to ask the right questions.

And to ask the right questions, the buyer must know what it is that he needs and what to expect when he buys.

He cautioned against taking at face value advertising statements that imply programmers are not necessary, that a packaged product will fit a particular individual business, that no special training is required or that a product is compatible with "any operating system."

"You don't hear unqualified recommendations of many packages," he said. "Users are not saying that packages answer their needs. What a piece of software does and what its designers and users think it does are not necessarily the same thing, and what you get is not necessarily what you see in user documentation," which tends to reflect the design objectives for an ideal system operating after it was done properly and completely.

"A little knowledge is a dangerous thing," Mazzucchelli told his audience. "Know your application and

your technology. Once you know what you want you can ask specific questions."

Examine Product

The fundamental principle in dealing with a particular software package is to know that it works and how it works. And to that end, he emphatically cautioned buyers not to purchase a package without examining the source code. "I won't buy a software package if I can't look at the source code. Don't buy it if you can't," he said. The burden falls on the vendor to provide a mechanism where the buyer can see the code.

In addition to an examination of the code, an examination of the business itself is in order. The company must have both a product plan and a business plan in order to ensure the buyer of some continuity with the product.

Large-scale testing is another "right" of the buyer, one that is frequently available but ignored because of cost. Without realistic test data — both in size and complexity — a program is not properly evaluated, according to Mazzucchelli. "It's money well spent," he said.

One other area which was addressed by the Yourdon bill of rights is that of independent evaluation. Mazzucchelli advocated the development of an independent publication that would evaluate packaged products. The industry trade magazines cannot do this objectively, he feels, because of advertising income.

"Be skeptical," he said. "We are not in a mature [stage] and there are no stable products."

Draft Evader Hunt to Use Computerized Lists

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — Following a plan opposed both here and across the country by the American Civil Liberties Union (ACLU), the Selective Service System will soon begin gathering high school graduation lists, drivers' license lists and any other computerized listings it can use to track down the tens of thousands of eligible American males who failed to register for the draft this summer.

"There are hosts of lists that are available to us under the law, and we will utilize them all," Joan Lamb, Selective Service spokeswoman, told *Computerworld*.

But the ACLU has begun contacting local school officials requesting they not provide computerized graduation lists to the Selective Service. The same has been done for officials of state motor vehicle departments.

Lamb said the Selective Service will follow the privacy laws in obtaining and using the lists — which will be matched against the Selective Service's basic data file of registrants, expected to be completed within the next month — but she believes the various federal and state laws allow enough leeway to gather enough files to track down most nonregistrants.

'Not Many People'

"There's not going to be that many people to identify," she said, noting the Selective Service estimates 93% of the 3.88 million draft-age males have registered and there is "a steady trickle" of completed registration forms still coming in. The rate is much higher at this stage of the registration than it was during the 1973 registration, when the Selective Service eventually claimed 98% voluntary compliance.

Those who do not show up at post offices to fill out registration forms will be identified through the data matching techniques and their names turned over to the Department of Justice, Lamb said. Then they "will probably get a visit from someone at the local FBI office," according to Lamb, who added "it is my understanding they will give them an opportunity to register" before the government decides whether to prosecute.

The maximum penalty for not registering is a \$10,000 fine and five years in jail.

Selective Service refused to say how the lists will be gathered and the actual data matching done. David Cox, associate Selective Service director of management information systems, whose office would carry out the data-matching operation, would not discuss any details of the program.

Cox said no decision has been made on how enforcement of the draft registration law will be handled, nor would he confirm Lamb's statements that a data matching program is definitely in the works.

"We haven't determined the final policy on that," he said. "There are several alternatives [to enforcement], final alternatives that we'll be considering." No decision will be made until the formal registration is complete, he added.

The Selective Service is now sending out acknowledgement letters to registrants to inform them of the data the

agency has on record for them. As those letters return, either confirming the accuracy of or correcting that information, the agency will complete its files and then be in a position to consider enforcement alternatives, Cox said.

Lawsuit Pending

The ACLU, however, hopes by that time — roughly mid-November — to have a decision on its lawsuit against the Selective Service. Now pending in U.S. District Court here, the suit challenges the Selective Service requirement that youths supply Social Security numbers when registering. The ACLU expects Social Security numbers to be the prime instrument for data matching, according to ACLU

counsel David Landau.

Landau said the suit is based on the wording of the Selective Service law. "There is nothing in the statute that authorizes that disclosure [of registrants' Social Security numbers]," he pointed out, "and we feel it violates the Privacy Act."

According to the ACLU's reading of the Privacy Act, the draft registration effort constitutes a "new system of records and therefore we think they would have had to get a statutory exemption from the [privacy law's] prohibition on requirement of social security numbers," he said.

"And given the fact that Selective Service has stated that they'll prosecute you if you don't give your Social Security number, we think that is ex-

actly what the privacy act was designed to protect," he said.

By forcing the Selective Service to delete those numbers from its files, data matching should be made more difficult, according to Landau. At the same time, he added, local ACLU chapters are trying to keep the lists needed for the data matching from being turned over to the Selective Service.

Landau said the ACLU has begun contacting local school officials requesting they not provide computerized graduation lists to the Selective Service. The same has been done for officials of state motor vehicle departments, "but motor vehicle departments have written back to us saying [registration enforcement] is a worthy cause," Landau said.

Control

Are you just looking at the tip of the job accounting iceberg?

A ship's captain uses radar and sonar to avoid hidden dangers of icebergs. Like any manager, a captain knows it's the "unseen dangers" that cause the biggest problems.

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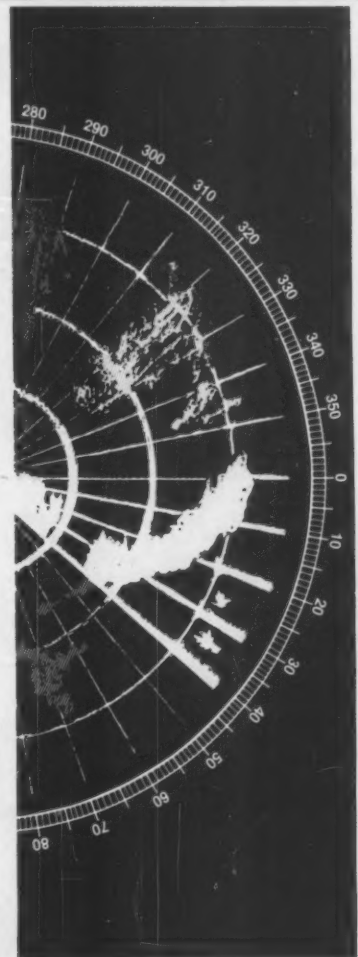
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Electronic Newspaper Plans Spark Union Strike

By Marguerite Zientara
CW Staff

MINNEAPOLIS — About 650 members of three unions at the Minneapolis Star and Tribune Co. here have gone on strike protesting, among other things, the newspapers' entry into Compuserve, Inc.'s experimental electronic newspaper project.

The firm, which publishes the morning *Tribune* and the afternoon *Star*, announced in June that it intended to go ahead with the experiment, although contractual agreements "have not been committed to writing, let alone signed," according to business manager Lee Canning, who noted there is a "very fine line" between negotiations and a final agreement.

In the area of electronic newspaper experiment, workers are concerned about both job security and jurisdiction — "who's going to do the work and where it's going to be done," according to Newspaper Guild spokesman Robert Haygen.

In addition, "we have a clause in our present contract that now provides that our members get 25% of the profit of any material that's resold by the paper to someone else," Haygen explained. "The company has proposed striking that language from the contract so that there would be no obligation on them to pay for material sold electronically."

No Money Estimates

As for an estimate of how much money workers stand to lose in the matter, no one seems to know. "One of the problems in this whole affair is that we've been unable to get a good grasp of what the future holds in this area," Haygen said. "The company has been unable to tell us exactly what they have planned — perhaps because they don't know, I'm not sure — but it's difficult to arrive at any accurate figures on what the value of it is until we're able to figure out what they're trying to do."

Besides protesting the electronic de-

livery of newspapers, workers struck in a bid for higher wages, a revision of the company's seniority policy and company car expense policy and assurances of job security.

And while the strikers are bargaining for several concessions, management feels everything but the money issue is a "smokescreen," according to Canning. "They want to gouge us for more bucks," he contended, adding, "We want to treat people as employees, not as stage actors."

On strike are 450 members of the Newspaper Guild, including reporters, circulation district managers, promotional personnel, copy aides, news technicians and clerical workers. In addition, 170 members of the mailers Union and "about 20" Machinists Union members are participating, Haygen said.

The other 10 unions represented in the plant are honoring the picket lines, Haygen said.

Meanwhile, about 600 management and nonunion personnel are rising to the "daily challenge" of publishing limited editions of the two papers, which are being sold "out the front door" because the truckers are honoring the strike, Canning explained.

Calling the effort to continue to publish "rather marginal," Haygen noted that management "is urging people to cross the picket line to buy [the paper]."

While a Compuserve spokesman would not comment on the Minneapolis situation, he noted his firm has encountered no similar problems with other papers planning to take part in the project.

A total of 13 U.S. newspapers have signed up for the experiment, all of them Associated Press members, the spokesman noted. With all of them scheduled to hook into the system one at a time "between now and July 1981," according to Compuserve, Minneapolis will join in late spring or summer 1981, Canning said.

As for whether the electronic newspaper poses a serious threat to the newspaper business, Compuserve's spokesman commented that it could not even begin to replace the newspaper.

"The project is simply an experiment to see how it works, whether people like it, to see what people want delivered electronically and to see whether it is, indeed, the up-and-coming technology," he maintained.

DPers Seen Pulled Into Office Unions

(Continued from Page 1)

18, Sept. 15).

But unionization vs. nonunionization is not the immediate issue here, Cohen explained. The question "that we're facing in all these cases is whether data processing is a sufficiently distinct group, a new group, a newly developed field of technology that's now coming into play in airlines and railroads more and more, to warrant their own representation. Because I don't think there's any question on the board's part that these people are covered by the [Railway Labor] Act."

"The only question," he continued, "is whether they belong in the office/clerical grouping or whether they are independent of that."

According to NMB practices, "all the carriers' employees in the same craft or class have to be in a single craft or class," Cohen said. "And there has been an historical tendency not to split crafts or classes into little pieces."

Keeping that in mind, it should be noted that in the Western case, "the

board determined," according to Cohen, "the community of interest of these people [DPers] was with the office/clerical craft or class."

Confusing Terms

Cohen objected to the term "forced unionization" and cautioned that the term "clerical union" should not confuse DPers who might be anxious about suddenly finding themselves represented by Brac or other "clerical" unions.

"We're not throwing \$40,000-a-year programmers into a group of \$10,000-a-year file clerks," he said. "There are plenty of highly paid technical people in these crafts and classes and they have historically been there."

Such unions are "not limited to clerical employees," Cohen said. "It's white collar, office units of nonmanagerial people. It includes accounts and various kinds of technicians. It might include engineers."

Cohen said the board believes it acted fairly in assigning Western's DPers to

Brac membership. The board conducted hearings at which Western argued its DPers were management officials. All points of view were presented, he said.

In addition, the board felt it had sufficient expertise to judge the merits of Western's arguments. "We also have data processing within our own staff," he noted. "We have a manager of computer services, our own computer setup. So we're familiar with what they do. We're not shooting in the dark on it."

Efforts by the affected employees to reverse unionization of their shops have so far been unsuccessful, although a petition by some 40 Union Pacific DPers to be granted their own union is still pending before the board.

Whatever the outcome of that proceeding, Brac will almost certainly press its DP unionization campaign at other railroad and airline carriers, according to Cohen. "I don't see how Brac or any other organization that represents white-collar people can leave data processing out for very long," he said. "I think there are too many people there to ignore."

The prospect of Brac's success is enhanced by NMB's administration of the National Railway Act, which established the agency. NMB tends to make industrywide decisions for the two industries, so allowing Brac to represent Western's DPers could be a powerful precedent unless the board agrees to the Union Pacific DPers petition for independence from Brac, he said.

All other sectors of private industry, on the other hand, are under the guidance of the National Labor Relations Board, which tends to set up union representation by identifying "appropriate bargaining units," according to Cohen. Such units could be small crafts or groups of employees of a single company or individual plants or firms.

As for the railroads, Brac has an even greater advantage because, Cohen said, "there is a great deal of standardization" in the industry. In recent national negotiations between Brac and railroad representatives, the union demanded to represent increased numbers of white-collar employees who had previously been nonunion.

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To Intel's 'Surprise and Satisfaction' IBM Continues VM Support for Fast-3805 FBA

By Rita Shoor
CW Staff

WATERLOO, Ont. — Customers for Intel Corp.'s version of fixed-block architecture (FBA) on its Fast-3805 semiconductor disk will not have to worry about withdrawal of IBM support for VM operating software — much to Intel's surprise and satisfaction.

Use of Intel's IBM-plug-compatible Fast-3805 with the recently introduced native mode (NM) [CW, Sept. 8] required modifications to VM, and a company spokesman had indicated that once altered, a VM operating system would not be supported by IBM. Instead, all future releases of the modified VM system would be supplied by the University of Waterloo, Ont.

That type of overall system support will not be necessary, according to Romney White, associate director of systems at the university. Citing the IBM "Information Bulletin for Customers' Alterations to IBM-Supplied Programs" (No. G120-2238-0) as his source, he indicated that IBM will, in fact, support the unaltered portions of its system control software. "Thus, our technicians will only have to provide support for the VM software modifications that we developed," he said.

'Reasonable' Interpretation

An IBM spokesman was unable to obtain immediately a copy of the specified manual. However, he agreed that White's statement was a "reasonable" statement of the position IBM's marketing staff takes with its customers.

Intel said it had misinterpreted the information it had originally received from White's group. "We'll arm our salesmen" with the correct information, Herb Oberman, product manager, said. He also stated that end users who form the customer base for the Fast-3805 operate in the type of sophisticated installation that would already be aware of IBM's position on alterations to system software.

The VM modifications were developed essentially by one person over a time period of a few weeks, White explained. The university technical staff had recognized the need for fast paging under its 370/VM operating system and had expressed interest in the Fast-3805 when it was originally announced.

Hardware Configuration

The Waterloo hardware configuration had included two IBM 2305s for several years, he noted, but contended that the 2305 was more expensive and had less available formatted space than Intel's unit. "We could only use 9.2M

bytes on each of the 2305s while the 3805 with NM allows full use of 12M bytes at a minimum," he said.

The decision to begin work with the 3805 may have been precipitated by the replacement of the installation's IBM 3031 mainframe with two 4M-byte 4341s, according to White.

Since another 2305 with an additional control unit would have been required, we would have been paying more to lease three 2305 drives and two controllers than we paid for the two 4341s with associated memory, he recalled.

"We suggested to Intel that they might want to consider FBA for the 3805," he said.

After negotiations conducted during May in Phoenix, the university agreed to develop the VM software modifications required to support the 3805 under NM.

There were basically two changes that had to be made because of the difference between the 3805 and any other direct access storage device, he said. First, the channel commands for the 3805 are different from both IBM FBA and count-key-data commands, he noted. Second, a new device-type code had to be added to identify a 3805 operating in NM to the VM operating system.

We don't anticipate many problems in supporting the modifications be-

cause the changed code isn't modified by IBM very often, White pointed out, and "the modifications aren't that extensive."

The university served as a beta test site for the Fast-3805 with NM during "approximately one week in August," according to White. Intel did its own engineering testing, he explained, and "we made the software changes and debugged them one weekend. It's been running ever since."

Although the Waterloo technicians are primarily engaged in running a computing center for the university, White said the Intel 3805 project was not their first venture into joint software development projects.

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Correction

In announcing plans to introduce a high-end B7900 and mid-range B4900 additions to its 900 series of computer systems, Burroughs Corp. Chairman Paul S. Mirabito was quoted as saying both CPUs would be compatible with Burroughs' existing upper end B6900 CPUs. The B4900 will not be software compatible with the B6900, a spokesman said.

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Net Standards Seen Opposing System Trends

By Phil Hirsch

CW Washington Bureau
WASHINGTON, D.C. — "Almost all" of the computer network standards now being developed by national and international groups "fall apart when viewed in terms of contemporary system trends," according to K.J. Thurber of Univac.

In a paper presented here last week at Comcon '80, a conference sponsored by the Institute of Electrical and Electronics Engineers, Thurber contended that X.25 and the recently developed "reference model" developed by the International Standards Organization (ISO) cannot accommodate hierarchies composed of internetworked local area networks. "The view of networks as a hierarchy is extremely important," he added, "because it is the only one which allows for rapid network development and isolation of design problems for future study."

Thurber indicated that until this division within the standards community is resolved it will slow the development of distributed systems.

Remotely Controlled Sites

Another presentation at the same Comcon '80 session, which was entitled "Network Architecture for Distributed Computers," described a scheme for increasing the capacity of distributed networks through the use of remotely controlled, unattended sites.

In this Distributed Machines System (DSM), explained George McQuilken

of IBM, one or more IBM 370 processors, utilizing the VM/370 operating system, each runs a number of similar machines from remote locations. DSM has been implemented in IBM's Subsystem Unified Network (SUN), which consists of 328 processor nodes in 76 cities spread among 16 countries.

The original DSM configuration consisted of two 370s — a VM 370/158 at the central (host) site and a VM 370/135 at the controlled (drone) location. Attached to the drone was a microprocessor-based restart processor which served as the 135's control device. The processor was connected to the 158 by a dial-up communications link. Later, the drone system was replaced with an IBM 4331 processor with a built-in control unit, but the basic operation remained the same.

"Programmed operator" software allows the drone to be run remotely by a person located at the host site,

McQuilken explained. "All the operations normally performed at the drone console can be done by the host operator. Physical services, such as mounting tapes or changing paper, have to be performed locally, but these functions are performed by semiskilled office personnel.

Included in the control software is a remote performance monitor which provides three basic functions:

- Threshold and warning messages. Whenever CPU, I/O, paging, or spool utilization exceeds a preset maximum, notice is sent to the host operator. Warning messages are also sent for missing I/O interrupts and for I/O errors.
- Performance displays. A variety of displays describing system and user status can be requested by the host operator.
- Trace display. A formatted and interpreted display of CPU trace tables

can be called and used for debugging.

"We have successfully demonstrated a system that can run unattended, receiving operational and system programming services through a network," McQuilken said. "Such a system can be used to extend a large network, such as SUN, into locations too small to justify a fully staffed computer center."

Another possible application of DSM, he added, would involve replacement of a large central processor with unattended nodes at major user locations.

"We anticipate that a host operator could successfully run 20 to 25 drones," he said. "Of course, other staff may have to be increased, but there is no reason to believe that distributed machines would require more staff for system programming and user assistance than a large centralized computing center does today."

Productivity Ills Tied to Management Focus

(Continued from Page 1)

leagues to "leave behind the age of MIS" and to move forward to computer-aided management systems.

What is computer-aided management? It is a management support system that ought to be closely patterned after proven computer-aided engineering design systems, Price explained. Such design systems have four characteristics:

- As the machine and man work to-

gether, the system makes it convenient and easy for the engineer to describe the problems to be solved.

• The system automatically prioritizes and relates various data elements, then reduces the data to a form pertinent to the problem to be solved. The system helps the engineer visualize his problem.

• The system uses stored data on the physical and chemical properties of materials and algorithms based on laws of physics and mathematics to help the engineer determine the result of alternative solutions. And it will output the chosen alternative so that its implementation is easily accomplished.

• The final element of any knowledge system is feedback and self-improvement.

These characteristics are found not only in engineering design systems but also in computer-aided medical systems, Price noted. Why not in American business?

Wrong Questions

Chiefly because the managerial question is likely to be "Why?" not "What if?" According to Price, top managers are more likely to ask the question, "Why is productivity declining?" rather than "What if productivity declines?"

"The point is," Price emphasized, "that because management processes themselves are not adequately understood, computer assistance in those processes is at best simplistic and at worst it actually hinders the management process."

What then are the objectives of a computer-aided management system for top management?

First, such a system is defined only by looking at the specific management purpose to be assisted and only as a part of a total process that assists that purpose.

Second, the system, as opposed to an MIS system, does not present all data on a class of problems. Rather, it correlates and synthesizes specific data and solutions for a specific problem. That is, it generates knowledge, not information.

Third, there is a direct input to the manager via the system from the employees.

The key fact is this, according to Price: "An effective system can only be built by examining a basic management process as to its data gathering, analysis, decision-making and feedback elements. Only then can a computer process be conceived that will assist or augment those processes."

Pan Am Grounds National Air DP

By Connie Winkler

CW Staff

MIAMI — Pan American Airlines, which recently acquired National Airlines, has grounded National's DP operation here and offered most of the data center's 106 employees the choice of moving to the Pan Am data operation in Rockleigh, N.J., or leaving.

The large National reservations systems, which handled thousands of calls a day, will be shut down in mid-November. However, the commercial operation is expected to continue through mid-1981.

Because the employees have been offered generous severance benefits if they stay with National until the entire operation is down, most are still uncertain about their future plans, according to a National employee who asked not to be identified. About 10 employees are believed to have left already.

Many of the National employees want to stay in Miami because of the cost of living and climate, the employee said.

Despite the general high demand for DP employees, one recruiter, David Strasberg of Data Sciences Personnel, Inc. in Hollywood, Fla., is uncertain how easily the National employees will move to other commercial areas. The airlines' work with specialized reservations systems that are considerably different from commercial Cobol programming, he explained.

About a year ago National culminated a large hardware upgrade which included the acquisition of 26 spindles of leased-Memorex Corp. 3650 high-speed, high-density disk storage and three IBM 370/158s, also leased. What will happen to that hardware is also unsure at this point.

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Each participant receives a copy of the visuals and texts of the vendors' presentations and large matrices comparing the key features of such leading DBMS as ADABAS, DATACOM/DB, DATAPOINT 2200, DBMS (Prime), DBMS 10/20, DBMS 11, DBMS-990, DG/DBMS, DMS II, DMS 1100, DMS 170, DMS 90, DPL, DRS, ENCOMPASS, EXPRESS, FOCUS, GIM-II, IDM 500, IDMS, IDS-II, IMAGE, IMS, INGRESS, INQUIRE, IQ/NET, MADMAN/MADTRAN, MANAGE, MAPPER, MDBS, MODEL 204, MRDS, NOMAD, OLIVER, ORACLE, QUESTOR, RAMIS II, RIMS, SEED, System 1022, System 2000/80, TOTAL, WALOS-II.

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This is no time to let up.

Includes 32-Channel Extension Amdahl Offers Multiple Enhancements for 470

By Rifa Shoor
CW Staff

SUNNYVALE, Calif. — Amdahl Corp. has announced several enhancements for its 470 mainframe product line that include a 32-channel extension feature, 4,096 subchannel capability and a 470 Extended Performance Accelerator, Amdahl said.

At the same time, it announced seven software products:

- MVS/Extended Channel Support (MVS/ECS).
- VM/Extended Channel Support (VM/ECS).
- Multiple System Communication and Control (MSCC).
- Universal Timesharing System (UTS).
- MVS/SE Assist Release 2.1.
- MVS/SE Support Release 1.0.
- Airline Control Program (ACP) Support.

Additional I/O Channels

Additional I/O channels will be available on the V/7 series and V/8 computer system in 24-, 28- and 32-channel configurations, according to an Amdahl spokesman. Software support for the additional channels will be available under VM with the VM/ECS program product, he said.

The user with an MVS operating system will have software support for the channel extension feature via the VMS/ECS program product, he said.

Purchase prices for the 24-, 28- and 32-channel configurations are \$425,000, \$575,000 and \$725,000, respectively, in addition to the 16-channel configuration price. Additional monthly maintenance costs range from \$2,260 to \$3,260 with two- and four-year lease plans also being offered, Amdahl said.

VM/ECS licensing costs \$1,000 per processor monthly with MVS/ECS licensed for \$500 per processor on a monthly basis, according to Amdahl. First customer shipment for the additional channels with VM/ECS is planned for the second quarter of 1981. Additional channels with MVS/ECS are scheduled for fourth-quarter 1981 delivery.

Amdahl is also offering a 4,096-subchannel capability for the 470/V7B, V/7A and V/8, according to a company spokesman. This option is priced at \$50,000 with no additional maintenance fee and first customer shipment is scheduled for the second quarter of 1981.

The final hardware announcement was the 470/Extended Performance Accelerator. Said to increase the performance of a 470 V/7B by as much as 50% to the level of the 470 V/7 with a single operator command, this feature "allows the 470 V/7B to back up any large computer system," according to Michael Clements, vice-president of engineering.

Available only on an hourly charge basis of \$300/hour so that "the user pays only for the number of hours the system is in the accelerated mode," he continued, there is an additional \$2,500 factory installation charge. Field installation costs \$3,000 and initial shipments are scheduled for the fourth quarter of 1981, Amdahl said.

Highlighted in the list of software offerings are Amdahl's MSCC and UTS

program products.

MSCC is utilized to loosely couple two processors and provide the end user with greater flexibility in job scheduling, a spokesman claimed. Although MSCC can be used to join two Amdahl-compatible processors, it is only being marketed to installations with at least one Amdahl processor.

UTS is essentially a modified form of the Unix time-sharing operating system Version 7 from Bell Laboratories, the spokesman continued. Amdahl's version reportedly brings Unix functions to large-mainframe end users.

MSCC first customer shipment is planned for the first quarter of 1981 and is priced at \$250 per processor on

a monthly basis. Available the second quarter of 1981, the UTS monthly fee is \$3000 per processor, according to Amdahl.

In line with previously announced plans to make internally developed software available to Amdahl-compatible sites without requiring that they also have 470 series hardware installed [CW, May 19], Amdahl is making its MVS/SE Assist (MVS/SEA) software available to this customer base. MVS/SEA allows IBM's MVS/SE Release 2 to execute on Amdahl-compatible uniprocessors without the extended facility feature, a spokesman explained.

Another program product MVS/SE

Support (MVS/SES), is specifically targeted toward older IBM 370 attached processor and multiprocessor system, he said. MVS/SEA and MVS/SES are reportedly functionally equivalent to additional machine language instructions in the extended facility of 370 Model 30 series and the extended feature of 370 models 148 and 168.

MVS/SEA is offered at a monthly fee of \$250 per processor with the MVS/SES monthly cost being \$1,750 per complex.

Amdahl ended its announcement with a formal statement of support for ACP and backed up this statement by introducing two five-day classes for ACP users costing \$900 each.

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Why Demand for Report Generators?

By Marcy Rosenberg
CW Staff

What is pumping the demand for report generators to an all-time high?

The increasing implementation of DBMS is one factor fueling the growth of report generators, according to International Data Corp.'s (IDC) *Independent Packaged Software Reference Book* due out at the end of the month.

"Clearly any DBMS requires some sort of report generation facility and the market for packages that interface with a DBMS will provide strong growth for the independents," the report stated. IDC called the market for report generation packages "the fastest growing area for independent suppliers of utility software," with revenues expected to increase at 38% compounded annually through 1984.

Audit and Access Need

What will keep demand in pace with these projections — besides the influence of DBMS — is a growing need for auditing software and for timely access to information, IDC stated.

Citing a rise in the incidence of computer fraud and embezzlement, the market research firm predicted tools to audit data will grow more attractive. There are a number of specialized report generators on the market today that are designed for auditors. Among them: Pansophic System, Inc.'s Pan-Audit, Cullinane Corp.'s EDP-Auditor and Program Products, Inc.'s The Audit Analyzer.

The growing demand for immediate access to information by non-DP management is also proving a boon for report generators and for end-user-oriented query facilities with simple, English-like commands, the report observed.

New Wave Predicted

In fact, industry watchers predict the emergence of a new wave of products — interactive report generators that essentially would combine features of re-

port generators and query systems.

Report generators normally run in batch mode to go against a set of data and produce a report: Preparation and background execution can be done interactively, but only under on-line facilities like TSO, CICS and IMS/DC and not via the package itself, noted Cary Morrill, market research analyst for IDC's Services and Software Information program.

Query facilities, on the other hand, normally run in on-line mode to read a file and produce an answer, though

not as a formatted report because there is a limit to how much information a query system can provide before sacrificing response time.

As a compromise between the two, an interactive report generator would serve what Yale Landsberg, president of the consulting firm Omnibase Corp., termed "a large middle ground of users, that don't necessarily want to look at a whole file, but not just at a small part either."

A fully interactive report generator would also allow users to obtain an-

swers to queries on-line as well as check syntax and other errors as a program is being written, Morrill pointed out.

The beginnings of this technology can be seen as report generator systems move from providing only fixed-form report request languages to offering English-like free-form syntax, a trend Kevin Cooper, Pansophic Systems, Inc.'s manager of retrieval systems development, maintained will ultimately lead to question-and-answer dialogue systems.

Packages Allow Off-Loading of MIS Tasks

(Continued from Page 1)

dent generalized batch report generators that run on IBM and compatible mainframes under both OS and DOS operating systems.

There are several packages that run under OS, but not DOS. These include Focus, a reporting and query language with data base management facilities from Information Builders, Inc., and Harvest, a data base reporting system from International Data Base Systems, Inc. One that runs only under DOS is CA-Dart from Computer Associates, Inc., which claimed the package will support OS operating system versions by the fourth quarter.

Overview of Packages

The chart is not an exhaustive list of all commercially available products in this classification, nor does it claim to describe every technical feature or parameter to be considered in a comparative evaluation. It presents, instead, an overview of 11 representative packages. All entries are based on manufacturers' claims.

Entries under the chart category, "Vendor Classification," relate how a vendor describes its own product, indicating whether the software is a stand-alone report generator or part of a data management or other system. The difference between the stand-

alone and other packages lies in the extent of capabilities offered beyond strictly report writing.

For example, a report writer can be considered a read-only system; a data management system can have report

Indeed, data base management systems (DBMS) can also provide report generation capabilities. However, those independent report generators that access only the files of their vendor's DBMS were not included in the chart because they are less "generalized" than specialized.

Examples of such data base reporting systems that run in IBM and compatible operating environments include:

- Cincom Systems, Inc.'s Socrates, which was designed to access only the files of that vendor's DBMS, Total. Cincom claims Socrates can also access non-Total sequential files and will be enhanced to also support Isam files.

- Software AG's Adacom for its Adabas DBMS.

- Applied Data Research, Inc.'s Data-reporter for its DBMS, Datacom/DB.

- International Data Base System, Inc.'s Harvest, which supports only the file structures of Seed — that vendor's DBMS.

- Arap's RPW II, the report writer option for that manufacturer's DRS DBMS.

Culprit, the report generation package of DBMS vendor Cullinane Corp., was included in the chart because it interfaces to several DBMS in addition to Cullinane's own IDMS and supports a number of non-IDMS file structures.

Besides the ability to interface to one or more DBMS, Cooper cited as another feature to look for in report generation systems the ability to produce reports in different formats — by modifying the package's default parameters, for example. As important is the ability to allow each line to have a different format, an especially valuable feature for organizations that rely more and more on preprinted forms. All products listed on the chart claim to offer this capability.

Other features these packages shared were that each lets users do conditional processing and allow multiple levels of logical expressions.

Another characteristic worth noting is the difference between "load and go" and "compile and go" report generators. Simply put, "load and go" systems can read input statements, determine what is to be done and begin the process, whereas the other type of system functions more like a compiler preprocessor — the source code generated has to be compiled into object code before processing can begin.

According to Cooper, whether or not a system is "load and go" may indicate something about its efficiency in terms of processing time and core requirements.

Product Spotlight

generation capabilities but can also be a utility package and program development language in its own right, commented Carole Morton, director of software development for Dylakor Software Systems, Inc.

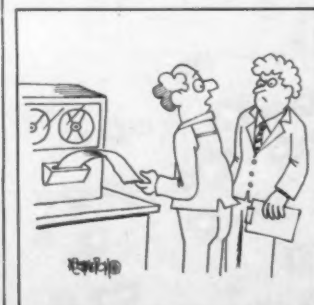
As a utility package, the data management system can perform such functions as reading files and selectively dumping records. As a program development language, it "should handle numbers of things Cobol could do — update and create files for example," she explained.

Inefficiencies Pointed Out

But as Yale Landsberg, president of consulting firm Omnibase Corp., pointed out, although data management systems allow users to generate reports without the need for programming, they accomplish this function less efficiently than would a Cobol program. "Data management systems are only as efficient in producing reports as the access method they use."

On an individual user basis, these inefficiencies are almost trivial. But, Landsberg added, as the package gains popularity in an organization and more and more individuals use it to run ad-hoc reports, "what was a gadfly of inefficiency becomes an avalanche."

Report generators grow more efficient, he said, if processed against a data base because the data is better laid out and more accessible.



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Cost Factors Evaluated Method Compares Centralized, DDP Networks

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. — A method for comparing the benefits of centralized vs. distributed data processing (DDP) networks was presented here last week by D.J. Sykes, of Honeywell, Inc. He was among the speakers at Comcon '80, a conference sponsored by the Institute of Electrical and Electronics Engineers.

Key factors to consider in evaluating the two architectures, Sykes said, are the costs of central and satellite processing sites, communications and queuing delays.

Regarding site costs, there may be an advantage in using a distributed architecture, he added, since the price per million instructions per second (Mips) processed tends to be less. Essentially, this is because the mid-range computers typically used as satellite processors have a better price/performance ratio than the larger machines employed in centralized systems.

"The minicomputer offers a lower entry price as a satellite [processor], but when configured with adequate memory, peripherals and communications ... there is not a striking difference between the overall prices.

"Furthermore, a given instruction rate in a mini may or may not equate to the equivalent number in a larger machine, [and] the software differences between a mini and a larger machine can result in significant application de-

velopment costs to the user," Sykes said.

While the cost/Mips ratio depends partly on the class of processor chosen, it also "can vary significantly with the instruction mix, cache hit ratio and I/O interference, which are dependent on the [processor] software characteristics," Sykes pointed out. Finally, the choice of lease or purchase ... can substantially affect the value of this coefficient.

Because data communications costs can be compared, it is necessary to quantify "total traffic volume, the dispersion of the terminals, the bandwidth required, and the hours a user is connected per day," he added.

"For low-volume, long-distance and high-bandwidth situations, a value-added carrier usually is competitive. For high-volume systems with a high degree of natural clustering, it is usually more cost-effective to use leased circuits such as AT&T's Dataphone Digital Service (DDS)."

Delay Costs

In both centralized and distributed systems, he said, as utilization of a site processor or communications link approaches 100%, delay increases dramatically. The cost of that delay can be reduced, but only by purchasing more processor or communication capacity. Sykes' key point was that increasing one of these capacities often will produce far greater benefit than in-

creasing the other.

"In a centralized or distributed system, there are several facilities cascaded, each contributing to the total delay at a user terminal. Each facility also contributes to the total cost, but not in the same proportion as its delay.

"In a centralized or distributed system, there are several facilities cascaded, each contributing to the total delay at a user terminal. Each facility also contributes to the total cost, but not in the same proportion as its delay. Consequently, by judicious selection of the value U [utilization] for each facility, the total cost can be reduced while maintaining the overall response time."

Consequently, by judicious selection of the value of U [utilization] for each facility, the total cost can be reduced while maintaining the overall response time," Sykes said.

To illustrate how these concepts can be applied, Sykes' paper included a comparison based on a system having the following characteristics: a peak load of 25 transaction/sec with a mean response time of 3 seconds; a data base of 1G bytes; 1,500 terminals divided into five geographic regions; concentrators or satellite processors 1,000 miles from the central host processor and connected via DDS; remote termi-

nals in the same building as the concentrator or satellite processor; a capability of processing 80% of all transactions locally; and a cost of \$15/user hour for service interruptions.

The comparison was based on a centralized network in which the host computer was connected to the remote terminals via five concentrators; a distributed system utilizing attended satellite processors instead of concentrators; and the same distributed system with unattended satellite sites.

The first step in the evaluation procedure, Sykes said, is to determine the capacities of the processing units and communication links needed to produce the required response time at the lowest cost.

"Next, the number of spindles of mass storage is determined, then the number of hours of service interruption is calculated using typical values of availability. Finally, the costs are determined using current figures for the industry," he added.

Sykes' conclusion was that the unattended distributed architecture would cost 80% as much as, and the attended distributed configuration would cost 10% more than, the centralized system. "Although the results are very specific to this case study," he noted, "the following observations can be made.

"The total cost of the distributed system is less than the centralized system only if the satellites are designed to be unattended," he added.

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SDI Knuckles Under Pressure

DALLAS — SDI, Inc. which, in a sudden policy change earlier this month required all users of its software to commit to two-year leases or face product expiration [CW, Sept. 8], knuckled under to one customer here.

Affiliated Foods, a user of SDI's Grasp DOS resource management system for 10 years, threatened to file an injunction and won an extension before the grievance ever got to court.

SDI extended the user's contract to Oct. 15 so "we did not have to make a judicial complaint," Joe Vail, Affiliated's DP manager, said.

"We had been told that nobody could get an extension. I felt like SDI showed a wanton disregard [for its customers] and, until threatened with a suit, chose to take no action at all."

Needless to say, Affiliated Foods is not going to commit to a two-year lease with SDI.

System Security Termed A People Problem

By Tim Scannell

CW Staff

CHICAGO — A computer system's weakest link is the people in it.

A DP installation can have all sorts of screening devices, computer-access passwords and disruption alarms, but "once you inject people into that system you inject risk," Robert W. Edwards, manager of the systems security section at Computer Sciences Corp., (CSC) said.

Speaking at the recent National Symposium on Office Automation here, Edwards called people "the most easily subverted and most vulnerable" part of any computer system. In his address, he stressed the importance of "rudimentary" security checks such as checking on employee background and resume claims.

He also warned listeners at the Data Processing Management Association Education Foundation event to be on the lookout for signals of present or future security breaches, such as a drastic change in a worker's behavior patterns.

Unfortunately, in the automated office and most small business installations, computer security is often a "forgotten dimension," one that is "scrupulously ignored by a lot of people," Edwards said.

Fanning the flames of apathy is the fact that it is extremely difficult to detect or prosecute computer criminals. Currently, only 10 states in the U.S. have computer crime laws and three have bills churning through the governmental process, he added.

Therefore, preventing computer abuse and ensuring security is a company's internal responsibility.

Management Problem

Contrary to what many managers think, computer security is more of a management than a technical problem and will not work if "you hide your light under a bushel," he quipped. To be effective, even the most basic plan must be implemented, understood and motivated by everyone within a corporation from the janitor on up to the Chairman of the Board.

Employee screening should be a manager's first line of defense against fraud and computer-related crime. Before hiring people to work with sensitive data or operate expensive computer gear, managers should thoroughly check employee backgrounds and verify facts listed on resumes.

"There's a tremendous amount of fraud that takes place in that area," Edwards noted, adding that CSC has had a few "bad experiences" with people claiming academic training that they never had.

Prevent Easy Access

There are a number of ways to keep data from freely flowing up and down the corporate pipeline. Compartmentalization — restricting information to password-protected pockets — is one way, Edwards said. People in an office automation or DP environment should only have access to information they need to know.

Cleaning up information leftovers — whether it be a password scribbled on a piece of paper and tucked under a

terminal or data left in a computer's memory — is another way to put a lid on unauthorized access, he added.

In his position at CSC, Edwards, who describes himself as a "professionally paranoid security type," often deliberately penetrates a computer system looking for residual data that may have been left in memory. Surprisingly, 13 out of 20 times, he and his security crew have found sensitive mate-

'While hardware controls such as card-entry systems, data encryption and other "mean Marine and dogs" devices are effective in bolstering computer security, the best way to spot and prevent abuse is with a keen eye.'

rial remaining in the computer's memory after a program has run.

Erasing memory after each job prevents the next user from coming along and looking at another person's data simply by "browsing through memory," Edwards pointed out.

While hardware controls such as card-entry systems, data encryption and other "mean Marine and dogs" devices are effective in bolstering computer security, the best way to spot and prevent abuse is with a keen eye.

Since DP, because of its nature, fosters worker insularity and inhibits close personal communications, it is important for a manager to watch for subtle and sometimes extreme personality changes. For instance, if a normally dependable worker suddenly begins to drink heavily or becomes sloppy it may be a sign of problems that could eventually lead to computer abuse, Edwards stated.

In the same vein, if a data entry clerk inexplicably shows up one day driving a \$30,000 sports car, it would not be out of line to investigate where the means came from for that expensive end.

Examine Environment

Finally, Edwards told his security-conscious audience to examine a computer's future environment closely before installing a system. For instance, do not locate a computer in the path of an airport runway because the ground radar will play havoc with the system's memory. And do not place a multi million-dollar computer on an earthquake fault line.

As an example of poor planning, Edwards pointed to a large New York bank chain that was opening a branch office in Buenos Aires, Argentina. Located in the center of town in a shared building, the office would house the branch computer system and a small operations staff.

Upon closer examination, however, the bank discovered that one of its office neighbors across the hall was the bomb disposal unit of the government of Argentina. And it was not uncommon for the unit to tinker with its "little toys" back at the office, Edwards said.

Bank officials promptly rethought their plans and located the branch in a safer environment, he noted.

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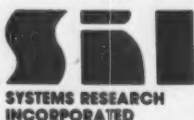
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Need Not Wait for Brooks Act Federal DPsers Told Not to Delay Modernizing

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — Legislation to streamline government DP management and procurement is now before Congress, but federal DPsers should not wait for a congressional mandate to modernize their operations, a consultant said last week.

Forest W. Horton, a longtime adviser to government agencies on information systems, told the Federal Computer Conference here Tuesday that agencies need not wait for passage of the so-called Brooks Act to identify and begin correcting the "unmistakable" problems of federal DP.

The Brooks bill, designed to revamp oversight of federal DP, has passed the House of Representatives but its companion bill is stalled in the Senate because the Defense Department fears it will allow civilian agency interference to jeopardize defense intelligence operations.

Termining the bill's controversy a "turf problem" that must be worked out between Defense and Congress, Horton said agencies should begin anyway to work on the obvious deficiencies in their DP operations.

Agencies should be "moving deliberately, methodically" to institute the changes that will be needed once the bill is passed. And even if the legislation is delayed for a long time or significantly altered before final approval, there are still good reasons to begin bringing agency operations in line with the bill's provisions, he said.

Agency Inabilities

The legislation already serves to point out obvious agency inabilities "to cope with increasing problems of cost and utilization" of information resources, he said. And it is not necessary to "go right down the line" in implementing the bill's provisions.

ACM Awards To Honor Two

NASHVILLE — The Association for Computing Machinery's (ACM) annual conference, to be held here Oct. 27, will honor Dr. Robert Metcalfe with the 1980 ACM Grace Murray Hopper Award, and Bernard Galler with the 1980 ACM Distinguished Service Award.

Metcalfe's award is given in recognition of computing achievements made by persons before their 30th birthday. His extensive work in the development of local networks, especially the Ethernet concept, won him this year's distinction and cash prize of \$1,000.

The Distinguished Service Award is presented in recognition of an individual's long-term service to the computing community and the ACM. Galler is a former president of ACM, chairman of the Turing Award Committee and the Government Organization Committee, as well as an active contributor in several other germane boards and committees.

He authored *The Language of Computers* in 1962, co-authored *A View of Programming* in 1970 and is currently editor-in-chief at the *Annals of the History of Computing*.

"There are incremental steps that can be taken," according to Horton.

He expressed amazement that many agencies do not have management mechanisms to bring together the managers of different information facilities such as libraries, records management and DP departments.

"We're constantly hearing that these technologies are converging," he said, "so it is obvious we need systematic exchanges" between those responsible for these technologies within each agency. These exchanges are vital to the kinds of decisions that are already being made, such as whether to use hard copy or microfiche on a particular project, Horton said.

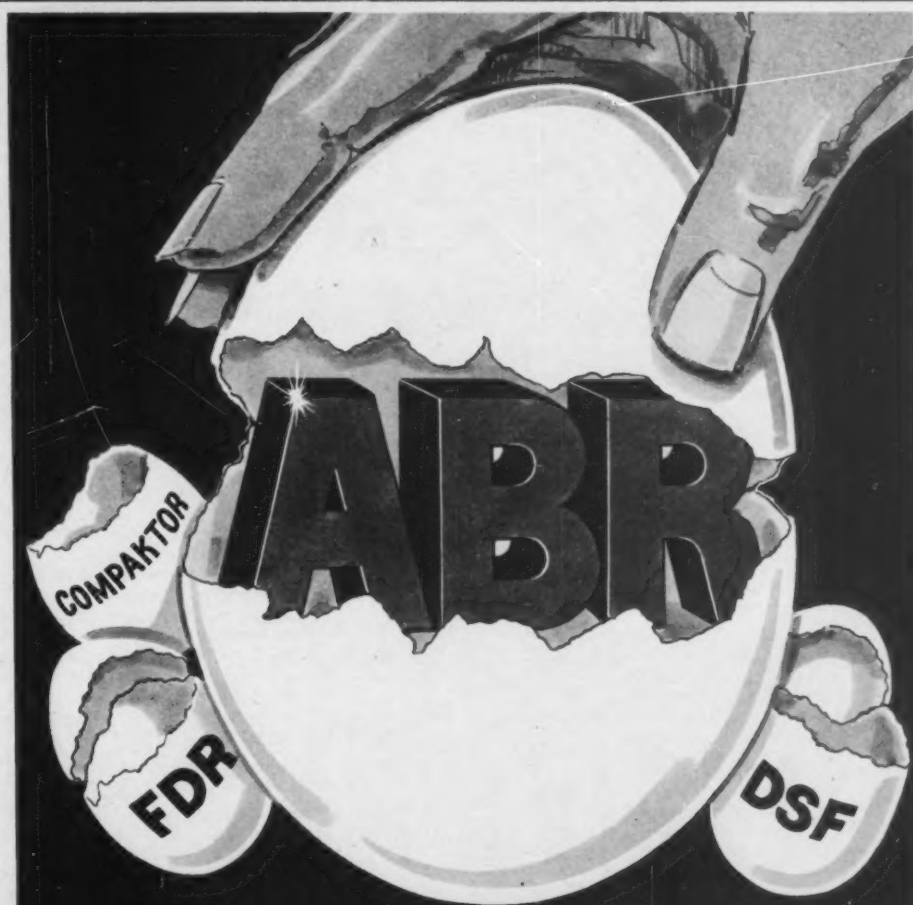
Noting the Brooks bill calls for agencies to prepare long-range information resource requirement plans, Horton suggested federal managers should move in that direction regardless of the outcome of the legislative debate.

CW at Federal Expo

Agencies have to put into place the machinery to "correlate" information requirements to information technology, facilities, people and other resources, Horton said.

The federal paperwork commission, whose final report was the basis for much of the proposed Brooks bill, found the public balking at supplying information to the government. The reason, Horton said, was the public was not convinced the federal government had "got its act together." There was no evidence the data being collected was needed, was being used.

Government DPsers have to prove themselves to the public, according to Horton, by offering better services more quickly, by reducing waste and fraud. The government, just as any organization, must manage people; so too must it learn to manage its information resources, he said.



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To Meet Long-Range Goals U.S. Agencies Told of Planning in 'Real World'

By Jake Kirchner

CW Washington Bureau
WASHINGTON, D.C. — Federal agencies may soon be required by Congress to produce long-range information resources requirements plans, but few government DPs are sure what the planning will entail. At last week's Federal Computer Conference here several hundred of them heard how it is done "in the real world."

At a Tuesday panel session, John M.

Bonaguide described how his company, Aetna Life and Casualty, Inc., forecasts its long-range DP equipment needs using a system that, in the words of the panel moderator, is "not an event but a process" — an integrated part of the whole corporate management structure.

Identifying hardware requirements for Aetna has to be a priority item, according to Bonaguide, assistant vice-president, Corporate Data Processing

Support. The firm's three data centers support about 70 million instructions per second (Mips) of processing power

CW at Federal Expo

with a dozen mainframes, including eight IBM 3033s, an Amdahl Corp. 470 V/6 II, a 470 V/8 and a Control Data Corp. Cyber 170-720.

The company operates four "major teleprocessing systems supporting about 5,000 on-line terminals as well as some 500 terminals for in-house time-sharing for program development support. Throw in approximately 16,000 hours per month of batch processing and 4,000 hours per month of batch testing and you describe a company that will live or die by the applications development and hardware procurement decisions it makes year by year.

Bonaguide's staff begins its "capacity planning process" by developing a general objective or policy for the company's operations, which is followed by a detailed forecasting process. The forecasting is done by small increments of time and along the lines of separate application needs such as batch processing, printing and so on.

Reasonability Forecast

This "raw data" on what the company does and how well it does it, with projected experiences is then submitted to a "reasonability forecast" that traces past trends and projects their future course as well as scrutinizing how the forecasting was performed.

"The forecast data is great in terms of what is already there," Bonaguide continued, but what about new or changing applications? The company uses a number of forecasting methods, from the simple — consulting operating divisions to track applications changes from a hard-copy operation to CRTs, for example — to the sophisticated techniques of computer simulation.

Through this forecasting process a plan is developed that incorporates the data from individual departments into a "total view" plan. That plan is then tested — by "trial and error," according to Bonaguide — to come up with different scenarios that might evolve according to such identifiable variables as those contained in the forecasts, known changing equipment needs and the expected capabilities of hardware already on order.

By looking at the various scenarios, the firm can begin to balance the operations of their three data centers, taking into account factors such as backup requirements and disaster recovery exigencies.

One of the keys to the planning process, Bonaguide said, is predicting the impact and timing of new technology. "We maintain quite an extensive intelligence network" for the firm's IBM-compatible operations, he said, through which Aetna watches not only IBM but IBM watchers.

Aetna also works closely with IBM and compatible manufacturers to try to get some idea of what equipment will be available down the road. Al-

though the information gathered directly from the vendors is necessarily vague, it can help in making expensive decisions, such as buy vs. lease on certain types of equipment.

And it is not sufficient just to order equipment once the planning has identified a need. The company also works up an "equipment acquisition strategy" that seeks to balance company needs against vendor offers. The competition that results for Aetna's orders "can be fierce and pretty exciting," according to Bonaguide.

Bubble Chart

The final planning process is to put together a "bubble chart" that he described as a "very simplistic view of all the equipment we have in-house and on order" and how it will eventually be used and replaced.

The bubble chart amounts to a four-year scenario that also helps top management stay informed of the company's long-term DP needs. The company knows, for example, that by 1985 the data centers, which will eventually number five, according to the plan, will support about 200 Mips and as much as 700 to 800 Mips by the mid 1990s, Bonaguide said.

He was quick to add that the bubble chart is "really just the beginning," not the end, of the planning process. Because the plan is "very dynamic" it must be changed as various business pressures — competition, unexpected growth and so on — and changing government regulations necessitate restructuring company operations.

Even with the highly structured and detailed work that goes into it, the requirements plan is merely "a base against which to test change and monitor growth," he said.

Burroughs Gets Suit Reprieve

NORTHBROOK, Ill. — Quality Books, Inc. has given Burroughs Corp. until Oct. 14 to settle matters out-of-court before it files suit against the vendor for allegedly selling it a faulty computer system.

The publisher and book wholesaler originally posted a Sept. 14 deadline to answer claims that the firm sold it a defective B800 computer system, but at Burroughs' request granted a 30-day extension. If Burroughs has not made a motion to settle Quality Books' problems by that time, the company will file suit, Tom Drewes, the firm's president, said.

Quality Books contends that Burroughs misrepresented the B800 computer system sold to the company about two years ago.

In a newspaper advertisement placed by the firm in July, Quality Books claimed that it was the victim of "overly zealous computer salespeople" [CW, Sept. 8].

The ad, which ran in both the regional and national editions of *The Wall Street Journal*, brought in more than 300 replies from the "unhappy users of Burroughs B800 and similar Burroughs computer hardware and software."

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Debate on Cost and Burden Of Nine-Digit Zip Code Enlivens House Hearing

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — The U.S. Postal Service (USPS) nine-digit Zip Code plan will be costly and complicated for U.S. businesses' DP operations, but it will ultimately be cost-effective.

This optimistic assessment by an executive of List Processing Co., a Chicago firm specializing in computerized Zip Coding applications, was one of the few upbeat statements made about the Zip Code scheme at a recent congressional hearing.

But other witnesses were not so sanguine. One, Rep. Andy Maguire (D-N.J.) told the hearing that this "gadget-intensive" move by USPS to increase its automation will cost one company in his district more than \$200,000 to update its manual and computer records.

Maguire also quoted a recent *Computerworld* article in which the Los Angeles County DP director claimed the nine-digit plan, slated for implementation Feb. 1, will require alteration of 3,000 to 4,000 programs at a cost to the county of \$2 million.

"This kind of decision should never have been made without ... a convincing cost/benefit analysis justifying the decision" by USPS to go to the new Zip Codes, Maguire said.

Shared Burden

The hearing, held by the House Government Information and Individual Rights Subcommittee last Wednesday, was for the most part concerned with possible effects of the USPS plan on private citizens, but much of the testimony centered on the plan's burden on DP operations of U.S. companies and nonprofit organizations.

The cost of converting automated records to include the expanded Zip Codes clearly has many companies worried. Adding to their concerns is the fact that USPS has not produced a study of costs to businesses nor announced what incentives will be offered large mailers to make the necessary software conversions.

Despite these problems and although "major mailers must execute the development or purchase of computer software or programs to add the new code," James E. Pehta, List Processing executive vice-president, said that with "careful, detailed planning" the effort should be cost-effective. The ultimate benefits of speedier delivery and more pinpointed marketing should make the huge effort worthwhile, he told the subcommittee.

Inflationary Impact

Like Maguire, subcommittee member Rep. Peter Kostmayer (D-Pa.) is not happy about the nine-digit Zip's cost impact. He asked USPS witnesses to produce before the end of the year an "inflationary impact statement" for the plan. The conversion costs of businesses will certainly be passed on to consumers, he said.

Assistant Postmaster General Michael S. Coughlin, promised USPS will work up a report for Kostmayer and the subcommittee, but noted the Postal

Nine Digits May Tell Too Much

WASHINGTON, D.C. — The loss of some measure of personal privacy has often been the price paid for increased computerization in society, and the U.S. Postal Service's move to greater automation through nine-digit Zip Codes may be no exception, according to one member of Congress known for his work to assure privacy in the computer age.

While the new codes are not considered by the Postal Service a great threat to privacy because they identify individual street blocks and not individual residences, Rep. Richardson Preyer (D-N.C.) has for some time expressed concern about the possible use of the expanded Zip Codes to further red-lining schemes.

Red-lining refers to the practice of identifying certain neighborhoods as bad credit risks. The present five-digit codes and census track numbers can, through computer manipulation, be used for such illegal activity. (Continued on Page 18)

Service will supply large mailers computer tapes to help convert their automated address files.

Because the new Zip Codes will be phased in over a number of years and will be voluntary, the impact on the public and large mailers should not be too severe, Coughlin asserted.

What has U.S. companies worried, however, is that many rely on special postal rates offered organizations that use Zip Codes in their correspondence and that do at least some presorting of outgoing mail. For them the yet-to-be-announced USPS incentives are all important.

"Mailers simply want to know ahead of time what their investment in labor and new equipment to accommodate the new nine-digit code will return to their firms," agreed List Processing Co.'s Pehta.

"This issue, probably more than any other, will determine the priority of effort expended by mailers to implement and use the nine-digit code," according to Pehta, whose clients own more than 800 million name and address records that will be affected.

Difficult Conversion?

Beyond the incentive question, however, concerns were raised at Wednesday's hearing that converting manual and automated files will not be so easy as USPS claims.

Gerry Whiting, director of the Information Systems Division of the General Services Administration's National Archives and Records Service, told the panel "modifying computer-based mailing lists would be relatively inexpensive but complicated by problems in computer language compatibility." (Continued on Page 18)

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Japanese Planning Public Facsimile Network

By Molly Upton
Special to CW

ANAHEIM, Calif. — Japan's Nippon Telegraph and Telephone Public Corp. (NTT) is establishing a public facsimile network that incorporates several steps to make wider use of facsimile more feasible, according to Takashi Ohmori of NTT.

In a Wescon/80 session entitled "Advances in Telephone Switching, Trans-

mission and Customer Premise Equipment," Ohmori listed the pros and cons of facsimile and described the dedicated NTT net, which features editing intelligence.

The merits of facsimile are that it is rapid and accurate, reproduces as the original, can handle drawings, does not need an attendant at the receiving end, is economical because operators do not need special training and uses

regular phone equipment, he said.

However, the problems faced are the need for facsimile set standardization, communication cost reduction and a variety of facsimile communication services as well as end to end communication, he continued.

NTT Net

The NTT net, whose service will be available in Tokyo and Osaka at the beginning of 1981, will enable terminal simplification, "common utilization of redundancy reduction facilities installed within the network and high-speed transmission of coded facsimile signals via low-cost digital transmission lines," Ohmori said.

The service will feature multiaddress calling and automatic answering initially. Later, more services such as a confidential communication, a facsimile box and communications between different types of terminals will be offered, he added.

Central to the operational concept is the use of "lower rank telephone networks to concentrate facsimile calls."

He explained that "facsimile storage and conversion equipment provides redundancy reduction, signal storage and speed conversion."

Translation System

One proposed use of the network is to convert data fed into the network in mark sense form into Japanese characters at the receiving end. This technique can be used for reservations, information retrieval, information to subscribers and opinion collection, he observed.

An intelligent document editing system is being developed that will accept documents with certain correction marks and will transmit corrected copy to the receiver. The basic principle in the editing system is that it handles correcting parts as an area, Ohmori said.

A possible further step would be to connect the facsimile network with a videotex system, he observed.

Upton is editor of EPD/Industry Report, an International Data Corp. Publication.

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Digits May Tell Too Much

(Continued from Page 17)

activities by credit grantors.

Testifying recently before Preyer's Government Information and Individual Rights Subcommittee, a Federal Trade Commission (FTC) official said the likelihood of the new Zips being used for red-lining is not clear, but is definitely a possibility.

Geographic Criteria

"The nine-digit Zip Code would certainly enhance a creditor's ability to make creditworthiness evaluations based on geographic criteria by allowing fairly fine distinctions to be made on narrowly drawn, standard geographical units — for example, the side of the street the applicant lives on," according to Lewis H. Goldfarb, assistant director of the FTC's Division of Credit Practices.

While the FTC has not formally analyzed the possible effects of the new Zip Codes, Goldfarb noted Zip Codes have "become the standard geographical unit for identification of parts of major metropolitan areas for many creditors and marketing organizations."

In establishing credit evaluation systems, he said, "many creditors analyze their experience with customers in particular Zip Code areas and give that fact, i.e., the Zip Code in which the applicant lives, significant weight in determining whether to grant credit."

Racial Proxy

While using Zip Codes in that way is not in itself illegal, Goldfarb said "problems arise when, because of racial housing patterns, Zip Codes also function as a proxy for the race of the applicant," which may in some cases violate the Equal Credit Opportunity Act.

Various companies, including Montgomery Ward and Amoco Oil Co., have agreed to discontinue use of Zip Codes because the FTC felt they might have led to racial discrimination in

granting credit, he said.

While it is too early to say whether nine-digit Zips will lead to illegal credit practices, Goldfarb noted that "reducing the size of the geographic unit used in credit evaluation systems could make it more likely that the system will have a racially discriminatory impact because each unit would tend to be more racially homogeneous."

The possibility is "disturbing," he said, "and particularly so because of the availability of cross-correlations census data which show, on a Zip Code basis, such information as the 'dominant ethnic group' in a particular Zip Code and the percent of the Zip Code residents that are 'white,' 'Negro' or 'Spanish American.'"

Nine-Digit Code Impact Queried

(Continued from Page 17)

bility, completeness and the accuracy of tape-to-tape conversion using USPS-supplied data.

Inadequate Space

"Many computerized mailing lists do not have adequate space for an expanded Zip Code on current tape files, do not use compatible language, or are not amenable to tape-to-tape conversion for other reasons," according to Whiting.

Even where organizations, including government agencies — slated for early and mandatory conversion to nine-digit Zips — have "acceptably formatted" tape files, "mailing list errors or other differences could be substantial," Whiting said, "requiring a record-by-record edit or checking process."

"Large mailing list users maintain their mailing lists on electronic storage media, but may face substantial software costs if required to convert mailing lists to nine-digit Zip Codes," he added.

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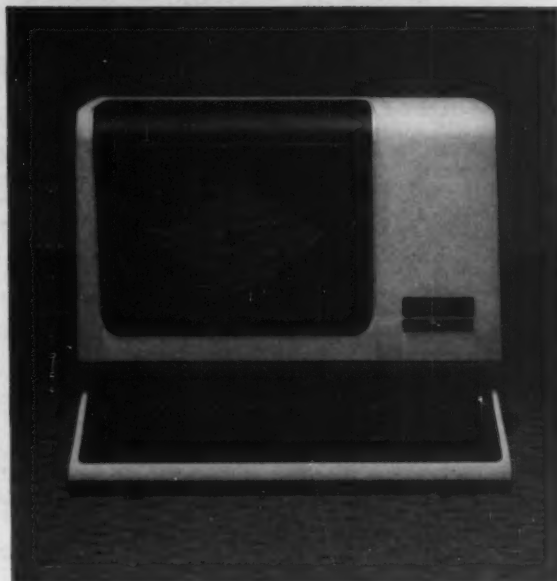
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Where you'll find the Retro-Graphics VT100, up and running, is at Info '80, New York Coliseum, New York City, October 6-9. Look for it at National Computer Communications' Booth #2132. Beginning in November, the Retro-Graphics VT100 will be sold through NCC as well as by selected other Digital Engineering distributors.

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ICP Scholarship Competition Open to Computer Students

INDIANAPOLIS — International Computer Programs, Inc. (ICP) will hold its third annual competition to award a scholarship to a computer science or computer technology student for the 1981-82 collegiate year.

The scholarship will consist of one-year's tuition plus education expenses up to a maximum of \$5,000 paid to the U.S. college or university of the winner's choice.

Scholarship selection will be based on the student's cumulative grade point average in his field of study, overall grade point average, need for financial aid, participation in data processing-related activities, school activities and leadership

roles and overall accomplishments and awards. An original essay will be the final test.

Last year's scholarship was awarded to Daniel J. Alion, a junior at Appalachian State University, Boone, N.C.

Applications will be available through the financial aid departments of most U.S. colleges and universities. The deadline for filing scholarships applications is Nov. 15.

Further information is available from Sheila Cunningham at ICP, 9000 Keystone Crossing, Indianapolis, Ind. 46240.

Students Must Repay Loans Made by Programming Error

By Deborah Wise
CW Staff

TORONTO — Students who received more than \$1.3 million in grants to which they were not entitled because of a computer programming error will have to pay the money back — but not immediately.

In 1978, the Department of Education in Ontario produced a revised student awards program. The Student Awards Department wrote the necessary programs for its IBM 370/168 to cope with the changes, according to Bill Clarkson, the department's director.

However, student lobbying for additional changes to the program was so

strong that Education Minister Bette Stephenson was forced to make more revisions. To implement these, the Awards Department had to change its initial programs in four months. It had had 12 months to produce the original version, and this time limit led to the problems.

The new programs were not fully tested and checked, Clarkson said, which led to 887 students being given more than they were entitled to. The story hit the news when these students were asked to pay the money back immediately.

Since then, the government's collection agency has softened its hard stand, requesting immediate repayment only from those students who drop out of college. Those who were wrongly allocated far above what they should have received have to start paying back a token sum of between \$5 and \$10 per month. Other students can wait until after they graduate before they repay the money.

Since then, the awards department has had no problems with its computer and has even changed to an IBM 3033, Clarkson said, maintaining that the limited time for proper implementation of the revisions was the major reason for the initial mistake.

Student union spokesmen resented the initial hard line of the administration, but have reconciled themselves to repaying the money.

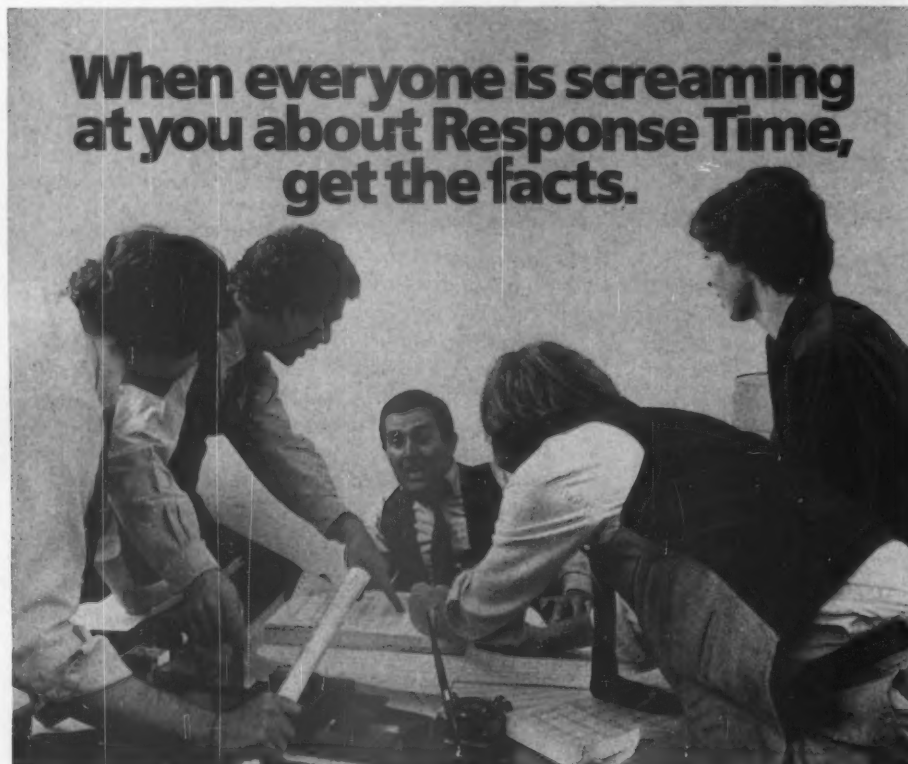
"I think most students realize that they will probably be asked to pay at the end of their education," Anderson Knight, vice-president of McMaster University's student union, said. "It's just that they don't want to have to pay it back right away."

Time-Sharing Seminar Planned for Oct. 28

SAN FRANCISCO — A one-day seminar on "Overcoming the Barriers to High-Performance, Low-Cost, Interactive Computing" will be offered here Oct. 28 by DTSS, Inc., a subsidiary of Metropolitan Life Insurance Co.

The course was designed for those interested in marketing time-sharing services as well as in-house users. Discussion topics will include a comparison of interactive computing with batch processing and differentiation of the markets for each; growth and profitability trends; history of time-sharing and interactive computing as a management and analytical tool.

The \$175 seminar fee includes the seminar, lunch and a hands-on session with the DTSS time-sharing system. Further details are available from Jack Elliott at DTSS, 10 Allen St., Hanover, N.H. 03755.



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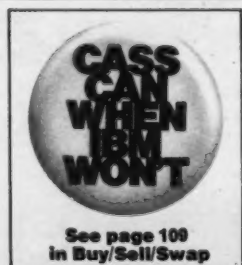
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Following Ansi Guidelines

NBS to Give Format Standards Over Four Years

By Tim Scannell
CW Staff

CHICAGO — The National Bureau of Standards (NBS) will release over the next four years a series of format standards aimed at improving computer communications and integration and at aiding electronic mail transmissions between automated offices.

The NBS-sanctioned standards — five in all — will be voluntarily developed by the user and vendor commu-

nity, following American National Standards Institute (Ansi) guidelines and processing requirements, according to James H. Burrows, director of the NBS' Institute for Computer Sciences and Technology (ICST). The ICST manages the governmentwide computer standards program and provides technical assistance to federal agencies.

At the recent National Symposium on Office Automation, sponsored by the Data Processing Management Association's Education Foundation (DPMA) here, Burrows gave a brief outline of each of the proposed protocol standards. The NBS standards will include:

- A message interchange format

standard, which will allow users of one system to send and receive messages from a foreign system.

- A flexible disk file format standard to establish common file formatting and labeling patterns for flexible disks.

- A text editing directives standard that will establish a common set of user directives for text editing systems.

- A text formatting directives standard to provide directives for text formatting systems.

- A message processing directives standard establishing a common set of commands for computer-based message systems.

The latter three standards will provide a minimum level of functionality

and help users switch from one text editing, formatting or message system to another, Burrows explained.

As a flagship for these five standards, the NBS is planning to release several guidelines geared to help users plan for, select and evaluate computer-based office machinery. The first guideline, "requirements analysis for office automation systems," which Burrows said will be available in late October or early November, will recommend a process to measure the benefits of office automation.

Drafts of the requirements analysis guideline have already been circulated to a number of federal agencies and vendors for comments.

One-Day Course On Mail Systems Slated for Fall

CAMBRIDGE, Mass. — An intensive one-day seminar on electronic mail for people investigating, planning, implementing and expanding computer-based message systems will be offered in seven cities this fall by the Bolt Beranek and Newman, Inc. (BBN) Information Management Corp.

"Electronic Mail: The Message System Approach" is scheduled to be presented in Boston, Oct. 14; New York, Oct. 20; Washington, D.C., Oct. 23; San Francisco, Nov. 5; Los Angeles, Nov. 7; Chicago, Nov. 17; and Dallas, Nov. 19.

The seminar will focus on how to start using today's in-place hardware and networks for electronic mail. It will be divided into two sessions. The morning session will concentrate on theory and the afternoon session on practice. The afternoon session will include a demonstration of three generations of electronic mail software developed at BBN.

Three experts on electronic mail will speak at every seminar and will be joined by a special guest speaker in each city.

The morning session will focus on theory and will include topics such as office automation and the role of electronic mail, computer communications in the office, the latest technologies and the industry's future. During the afternoon, speakers will discuss their first-hand experience.

The seminar fee, which includes a seminar notebook, is \$85 for the morning session, \$125 for the afternoon session and \$195 for both sessions including lunch.

The seminar has been developed by BBN Information Management Corp. and is offered in cooperation with CW Conference Management Group. Questions should be addressed to CW Conference Management Group, 375 Cochituate Road, Framingham, Mass. 01701.



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Most Staffs Report No Generation Gap, But

By Rita Shoor
CW Staff

Is there a DP generation gap between the veterans who entered the field at least a decade ago and the computer science majors who have been pouring out of the nation's colleges in the last few years?

"Absolutely not" was the response from nine out of 11 of the people polled during a recent *Computerworld* minisurvey. Six people with 10 to 20 years of information systems experience each, but nary a computer science degree among them were included in the survey sample. The remaining five DPers had specialized in either computer science or management information systems (MIS) in college.

All of the respondents indicated a communication gap of some sort plagued the programmers and analysts in the various organizations. However, friction among staff members because of age and/or educational background

differences was seen as a major contributing factor by only two of the people interviewed.

There was a definite communication gap between older analyst/managers and the younger programmers among the clients with whom Michael Smuda worked when he was a contract programmer for a now-defunct firm in Chicago. The new programmers preferred a structured programming approach while the more experienced staff members used their own programming style and favored GOTO statements, according to Smuda, who received his B.S. from Northern Illinois University in 1977.

Another respondent who graduated in March 1978 with a major in information sciences agreed with Smuda.

"The programmer trainees in our organization write beautifully structured programs," she said. "However, the older members of some of the system development teams don't think the

younger ones know what they're talking about.

"The old-timers might resent the kids out of college because they perceive them as having access to all of the new concepts," Jeff Benchley speculated. However, the "seat-of-the-pants" technician who is still in the field is at least as well informed as current graduates, maintained Benchley, assistant manager at the First National Bank in Lake Forest, Ill.

Problems in communication between nontechnical user department mem-

bers and the technically oriented programmer/analyst specifically were mentioned by two respondents. "Everyone [in the user area] is afraid of what the DP department is going to do to them instead of thinking about what [the programmers] can do for them," according to Kerwin Crist, DP and programming/analysis supervisor for the Oklahoma Tax Commission.

Crist, a business college graduate who majored in accounting and began working with computers in 1961, maintained that the media has served

Computer Crime Abstract Issued Under Justice Aegis

WASHINGTON, D.C. — A free compendium of computer-related crime legislation called the Legislative Resource Service (LRS) is available from Koba Associates, Inc.

Under contract with the Justice Department's Bureau of Justice Statistics, Koba collected up-to-date information on proposed, pending and enacted computer-related crime legislation. Model statutes are addressed and all legislation is indexed state-by-state in the 50-odd page document, providing access to the most recent rulings and developments in each ju-

risdiction.

The progress of federal legislation S. 240 is monitored, and relative appellate court decisions also appear in the LRS package.

Five hundred of the LRS packages will be available upon request on a first-come, first-serve, one-to-a-customer basis, as of November. Those who are not among the 500 will be able to buy the compendium for a fee not yet decided upon.

Koba Associates's Computer Related Crime Project is at 2000 Florida Ave. N.W., Washington, D.C. 20009

Infotech Zurich Meet to Cover Vandalism and Ergonomic Topics

ZURICH, Switzerland — The issues of industrial vandalism and rising ergonomic standards will be addressed at the Infotech state-of-the-art conference entitled "The Nonexpert User" here Sept. 22-24 by Tom Stewart of Butler Cox and Partners.

Stewart contends that equipment design must conform to high standards in order to minimize unnecessary errors and delays on the part of the non-technical workers using the computers.

Also present to offer their views on the subject will be Brian Shackel, Leela Damodaran and Ken Eason of the University of Technology in Loughborough; David Davies of Alpha Industrial Ergonomics Consultants; and Dennis O'Brien from the Home Office's Police Scientific Branch.

Further information on the Infotech event is available from Maureen Nichols at Infotech, Maidenhead, Berkshire, England.

ALA Series Treats Library Specs

OMAHA, Neb. — "Data Processing Specifications and Contracting" is the title of a series of regional tutorials sponsored by American Library Association's (ALA) Library and Information Technology Association (LITA). The first tutorial will be held here Oct. 28-30 and will be co-sponsored by the Mountain Plains Library Association (MPLA).

The tutorials have been developed to meet the needs of librarians installing or preparing to install varying types of automated systems. Since the degree of expertise of librarians can often vary greatly, the goals of these tutorials will be to establish a basic level of competence in developing functional speci-

cations, evaluating technical specifications, developing and evaluating bid specifications and negotiating and administering contracts for information processing equipment and systems.

Additional information and registration forms are available from LITA/-ALA at 50 E. Huron St., Chicago, Ill. 60611.

JOB140

JOB141

JOB143 — YES, I'M AFRAID HE WAS
LOST IN THE LAST PURGE !

///

No

Point to Other Communication Difficulties

to develop and maintain this misconception of the technical specialist. Computer-related crime is played up in the newspapers, he claimed.

The user-programmer communication gap would narrow if the media would stress the benefits of DP, he maintained.

User communication was mentioned as causing a "slight problem in the past" by another technician. "However, these have diminished with experience to the point where they're no longer a problem," he said.

High-level MIS managers also were charged with contributing to communication problems by two survey respondents, both of whom preferred to retain their anonymity.

"The lower level people are afraid to say what they think. They're afraid to get jumped on [by management]," said one programmer.

The management/staff communication "was the worst I've ever seen," said an 11-year veteran of the 60-person DP organization she had worked with. "Management didn't tell

the staff anything that was happening and wasn't interested in the staff's technical opinions," she recalled. In addition, the DP managers didn't tell the user departments anything, she said. "Essentially the managers talked to themselves."

Three of the survey respondents indicated that language difficulties presented a communication problem among the programmer/analysts on their particular staffs. Although not tied to a specific geographic location, all three people mentioned some diffi-

culty in discussing technical concepts with programmer/analysts who spoke English as a second language.

The problem is compounded by the fact that it is often undetectable during the interview and hiring process, according to an advisory systems engineer and project leader at one installation.

"You don't realize that the programmer didn't understand what you were talking about until after he or she has written a program to solve a problem that didn't exist," she explained.

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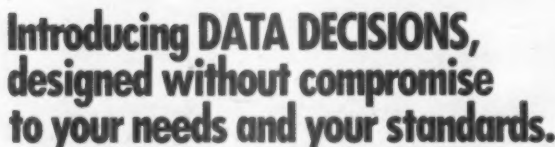
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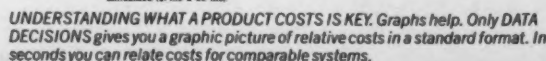
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Finalists in the \$150,000 Sahara Summer Blackjack Classic, sponsored by the World Championship of Blackjack, Inc., get ready to place their bets. Avery Waisbren, (center) Studio City, Calif., was the winner of \$50,000.

Small Business Computer Proves Safest Bet in House For Blackjack Promoter

TARZANA, Calif. — The originators and promoters of Tournament Blackjack — a game played by thousands around the world — do not gamble when it comes to the behind-the-scenes organization necessary to plan, promote and track the players of each tourney.

Instead, World Championship of Blackjack, Inc. (WCBI) here relies on a small business computer for such details.

Tournament Blackjack made its debut at the Las Vegas Sahara Hotel during the week before Christmas in 1978. "That week before Christmas is traditionally the slowest week of the year for any Las Vegas hotel," noted David Fishman, vice-president of WCBI. However, "while every other casino in town was practically empty, the Sahara casino was in high gear." Since then, the tournament has snowballed to a three-city event four times a year.

With no ceiling on winnings and with losses limited to the \$500 buy-in fee, Tournament Blackjack has attracted thousands of players through a diversity of promotional efforts.

A million and a half brochures are mailed each year to prospective players, while two toll-free numbers each receive close to 10,000 inquiries per tournament.

World Championship of Blackjack maintains a prospect list of about 75,000 names broken into lists of names purchased from list brokers, players who have participated in previous tournaments and people who have responded to various advertisements but have never played in a tournament.

Besides the work of attracting players, the company must keep track of all the registrants, their winnings, player profiles, hotel accommodations, travel arrangements and charter sponsors. (Previous players who sponsor new players receive cash bonuses).

In addition to the 20 or so full-time WCBI employees, there is an independent sales representative program that involves close to 100 people, mostly tournament players who work part-time to recruit new players from their hometown areas.

In addition to the normal payroll, accounts payable and receivable operations, the firm must keep count of sales representative commissions and territories.

"Before we brought in our computer, we were going through temporary help like crazy," Fishman said. "Those people get expensive and generally do poor work. We were having big problems just trying to keep our mailing list clean; we were keeping track of so much manually that nothing was being handled well. Then we hired a computer analyst to work here for six months and help us determine how to computerize our business. It was the best money we ever spent."

"At the end of six months, that analyst knew every facet of our business as well as we did. She really understood how this whole business operates, what makes us successful and what problems can really hurt us," Fishman said. "She agreed that a com-

puter could definitely help us do more efficient mailings as well as provide a means for us to handle a vast array of detail and statistics."

After looking at small business systems from most of the major computer companies and then narrowing that group to Texas Instruments, Inc., IBM, Univac and Qantel Corp., WCBI eventually chose Qantel system because of its local Metropolitan Business Systems distributor.

"We learned they had a superior service record when we checked references," Fishman noted.

"We also found that the Qantel systems provide virtually unlimited advancement into larger storage capacity and features multitasking to let us do several kinds of work on the computer at the same time," he added.

World Championship of Blackjack signed a Qantel contract in February and had its computer by April. The first application to go up was the mailing list maintenance systems. "We do mailings every day and it is wonderful to have a computer store all our mailing lists whatever way we need them by Zip Code, individual tournament, charter members," he said.

"We can do automatic updates, add new names and drop old or duplicate names easily and each day we enter inquiries from ads, brochures and our toll-free telephone numbers. The computer generates mailing labels, each label coded so when a response to a mailing comes back, we know what mailing it came from."

"Then we run weekly reports analyzing what mailing lists or promotional efforts are receiving the most response and when the response level has been the highest," he continued. "Later, we analyze how many of these responses turn into tournament players and then into charter members. Thus, we always know how we're doing — what efforts work best and which ones may not be paying off."

Besides sending out mailings and tracking responses, the firm keeps its charter member profiles on the computer, and all of its confirmation letters to tournament players are computer-generated.

Report Details Audit Problems

ARLINGTON, Va. — "Data Processing and Auditor Independence" is the title of a recently released publication from the Association of Data Processing Service Organizations, Inc. (Adapso) that details the potential problems and inherent conflicts of interest for public accounting firms that provide computer and other management advisory services.

The booklet raises a series of issues for clients to consider prior to retaining an audit firm to perform DP functions.

Individual copies of the brochure are free; there is a nominal fee for multiple copies. They are available from Adapso at 1925 N. Lynn St., Arlington, Va. 22209.

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Meet to Spotlight Systems For Personnel Management

NEW YORK — The 11th National Conference on Human Resource Management Systems will take place here Oct. 20-22.

Sponsored by Information Sciences, Inc. (Insci), this year's conference will focus on the positive bottom-line impact of effective human resource management in both the private and public sectors.

Alan K. Campbell, director of the U.S. Office of Personnel Management, will be the keynote speaker.

More than 40 in-depth workshops will concentrate on specific areas critical to an effective human resource management process — from the design and installation of efficient, responsive information systems to cor-

porate health and fitness programs.

Further information is available from Insci at 95 Chestnut Ridge Road, Montvale, N.J. 07645.

BAI Conference Set

PARK RIDGE, Ill. — The Bank Administration Institute (BAI) will hold its third annual conference Nov. 16-19 at the New Orleans Hilton Hotel.

Devoted to automatic teller machines, the conference will be co-chaired by Linda Fenner Zimmer, a payment services correspondent, and James W. Trotter, systems specialist.

More information is available from the BAI at P.O. Box 500, 303 S. North-west Highway, Park Ridge, Ill. 60068.

Club Formed to Discuss Productivity in Industry

SCARSDALE, N.Y. — The Productivity Forum, a newly established club to discuss productivity and efficiency in industry, will publish office automation reports and state-of-the-art reviews for its members throughout the year.

Currently under way is a review of technical innovations by Wickam Skinner and James E. Robinson of Harvard University.

Membership fees of \$9,500 per year cover participation in conferences (the first one is slated for Oct. 1-3 in Chicago), use of the library facilities and access to the publications on the mailing list.

Members include Exxon Corp., U.S.

government departments, General Electric Corp. and the U.S. Postal Service.

The organizers, Work in America Institute, Inc., hope that major unions will participate before the end of the year. More information is available from Rhoda Pauley, Work in America Institute, Inc., 700 White Plains Road, Scarsdale, N.Y. 10583.

McGraw-Hill Plans Seminars For Managers

NEW YORK — Two seminars for data communications and data processing managers are scheduled for November and December by *Data Communications*, a McGraw-Hill magazine.

"Standard Architecture, Interfaces and Protocols" will be held Nov. 5-7 in Toronto and again Dec. 9-11 in Dallas.

Topics to be examined include fundamentals for planning, designing, implementing and managing information systems and services to meet organizational needs.

The cost of this seminar is \$650, with National Communications System senior engineers Harold Folts and Frank McClelland lecturing.

"Corporatwide Packet Data Networks," which will take place Nov. 6-7 in Washington, D.C., will focus on the technical design, economics and managerial implications of integrated, corporatwide data networks based on packet switching. Network Analysis Corp. executives who will lecture are Jeffrey Bloom, Walter Roehr Jr. and Thomas Stack.

The cost of this course is \$475. More information can be obtained from McGraw-Hill Conference & Exposition Center, Room 3677, 1221 Ave. of the Americas, New York, N.Y. 10020.

Manual Writing Topic of Course

COLORADO SPRINGS, Colo. — Progressive Communications, Inc. will hold a series of one-day DP user documentation seminars in Denver on Sept. 23; Chicago on Sept. 25; Palo Alto, Calif. on Oct. 14; Los Angeles on Oct. 16; Dallas on Nov. 4; and Houston on Nov. 6.

According to the course's sponsor, the seminar will focus on writing DP user manuals that people will want to use.

Emphasis is placed on analysis of specific user needs, planning and outlining, effective writing and illustration, and maintenance and packaging of documentation.

The fee for the course is \$185 for individuals, or \$165 per person for multiple enrollments from the same firm; the fee includes all materials and lunch.

More information is available from Progressive Communications at the Alamo/310, 128 S. Tejon St., Colorado Springs, Colo. 80903.

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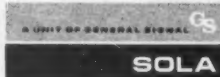
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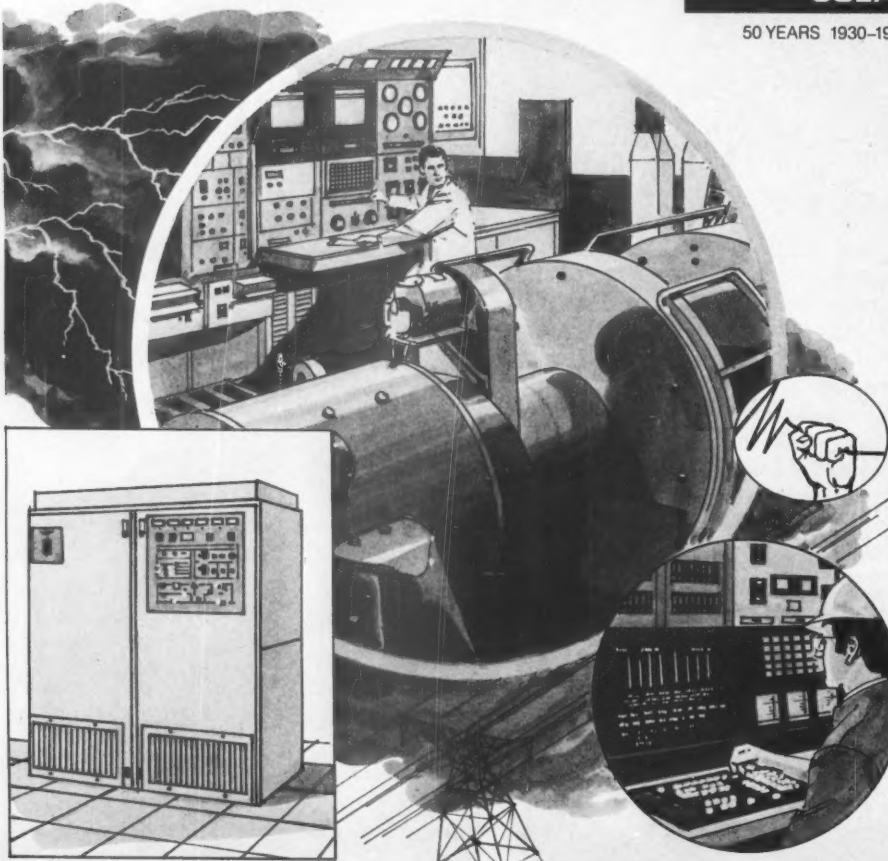
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At Civil Air Patrol (CAP) National Headquarters, Montgomery, Ala., an NCR 8350 computer system is used to automate membership and training record keeping. Comprehensive computer profiles of nearly 60,000 members help CAP assure that only qualified members are sent on search and rescue missions and that CAP cadets earn credit from the Air Force for their training if they enlist in the service.

Mini Screens Rescue Crews For Civil Air Patrol Missions

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MONTGOMERY, Ala. — A commuter airline crashed in the Rockies two years ago during a raging blizzard, stranding 22 people in freezing sub-zero temperatures. Less than 12 hours later, a Civil Air Patrol (CAP) search-and-rescue team, its members screened and selected by a minicomputer, located the survivors and saved all but one life.

"When CAP responds to an emergency, the members it sends to the scene must be properly trained," Lt. Col. Joseph J. Matisak, deputy chief of staff for personnel here at CAP's national headquarters, explained. "People who don't know how to act in a crisis can injure themselves or jeopardize the safety of others."

Using an NCR Corp. 8350 minicomputer, CAP personnel run an integrated package of computer programs that give the organization and U.S. Air Force administrators accurate, up-to-the-minute data and trend analysis reports to effectively manage people, equipment and dollar resources, Matisak said. The computer helps minimize administrative and overhead costs and maximize information available to a handful of CAP and USAF supervisors to direct nearly 60,000 people in the organization's 1,900 units across the U.S.

More importantly, aided by the minicomputer, CAP rescue teams have so far saved more than 100 lives.

Defense Department Support

Although CAP is a private corporation chartered by Congress in 1946, it also is an official auxiliary of the USAF. To help meet CAP's needs, the Department of Defense (DOD) donates surplus military equipment and supplies ranging from aircraft and motor vehicles to radios and office furniture. About 200 active-duty USAF members serve as advisors to the organization, a little less than half of them

working out of CAP's national headquarters.

While the CAP-USAF collaboration is mutually beneficial — CAP members receive valuable training and the government saves roughly \$20 million a year on search and rescue missions — it poses some interesting administrative problems, Matisak stated. For example, CAP's accountability for all DOD-donated surplus equipment requires keeping meticulous equipment records regarding the use and, eventually, the proper disposal or sale of former DOD property.

"Everyone wants to hold the lid on administrative costs," Matisak continued. "Higher costs would mean higher member dues for individuals who already are donating time and often personal equipment to help the organization." Also, "with our computer system, we are holding down information management costs. I don't think it would be possible to return to the previous labor-intensive manual system."

Matisak is responsible for the efficient operation of the DP department. The department provides the USAF-CAP personnel section with most of the data it needs to advise CAP on programs and policies related to civilian and military personnel, reserve assistance, aerospace education and other matters. However, the department also furnishes data and reports to many other individuals and groups located in the field and at CAP headquarters.

More importantly, CAP keeps training records and can validate its members' experience levels. "If an individual transfers from a unit or squadron in Alaska to one in Alabama, his or her computerized profile transfers, too," Matisak noted.

Two Categories

Basically CAP computer programs are divided into two broad categories: (1) personnel and financial accounting
(Continued on Page 34)

Costs Cut to \$1.60/Terminal Hour

Network Plan Keeps Campus Within Budget

AMES, Iowa — Inflation and a rising demand for computer services spurred Iowa State University here to reduce its academic costs to \$1.60 per terminal hour by combining load sharing among several systems with an upgrade of its mainframe system.

As an added benefit, the strategy has increased student access to computing and expanding usage requirements can be more easily accommodated.

Before 1978, the Computation Center at Iowa State, an institution of eight colleges and 23,000 students, relied heavily on centralized mainframe systems for most campuswide services.

"Accessibility to computing was a problem for our students. There was a real need to extend interactive access to computers to wider segments of the academic population, but budget constraints would not allow outright replacement of our mainframes with even larger machines," Dr. Clair G. Maple, Computation Center director, said.

Five-Year Plan

To satisfy the growing demand for computing with that limited budget, the Computation Center staff developed a five-year plan to acquire computing hardware in a cost-effective fashion. The goal was to optimize the efficiency of existing resources and to raise, incrementally, the number of terminals at the lowest possible cost.

To increase student access to computer power, the center planned to place terminals in convenient locations and to use hardware with up-to-date technology for maximum performance.

The plan called for a campuswide network that would match computing capabilities to individual requirements on a job-by-job basis. This network would connect users automatically and transparently to the appropriate processors for their particular jobs, thus minimizing wasteful overhead and idle computing capacity.

AIIE Schedules Two Fall Meets

CHICAGO — "Financial Information Systems: The New Generation" is the theme of the American Institute of Industrial Engineers' (AIIE) fall conference, which will be held here Oct. 8-10 and again in New York, Nov. 19-21.

The first day of the conference will be devoted to an overview of existing financial information systems. Actual case studies and new developments will be examined on the second day, followed by a financial software expo, where systems will be demonstrated with on-line terminals. The theme of the third day of the event will be "Controlling Financial Information Systems."

AIIE members may attend for \$355, nonmember enrollment is \$395 and multiple enrollees from the same organization may attend for \$295 each. Fees include a 1,000-page conference notebook and refreshments. More information is available from the AIIE at Dept. W, P.O. Box 3727, Santa Monica, Calif. 90403.

To match capabilities with every job, however, required a range of systems to match the variety of jobs. The Iowa State Computation Center staff tailored its five-year plan accordingly.

Mainframe Upgrade

For the large number of long, repetitive batch jobs, the university's mainframe system was updated and enlarged. The relatively short, interactive, time-shared tasks for most students were off-loaded from the mainframe onto Digital Equipment Corp. VAX-11/780 systems equipped initially with 64 CRT and printer terminals.

For the real-time, measurement and

control applications in teaching and research laboratories, the university, with help from the National Science Foundation, developed a local high-speed data net containing microcomputers and a DEC PDP-11 that connected several science and engineering departments with the central facilities.

This strategy proved so successful that when funds became available the following year, another VAX-11/780 system and 76 more terminals were added, a spokesman said. The terminals were placed in special rooms in dormitories as well as terminal rooms in various academic departments to enhance accessibility for students at nearly all hours.

The usage cost of the network was calculated by dividing total hardware and software costs, including support personnel and maintenance costs, by the number of hours of terminal utilization. The result was a surprisingly low \$1.60 per terminal hour, the spokesman said.

The result of Iowa State's computer strategy has been an increasing involvement of students in computing activity for a manageable expenditure. A large percent of Iowa State's entire enrollment now uses computers. Usage on the VAX systems has reached more than 38,000 terminal sessions in a peak month, with sessions averaging more than 40 minutes each.

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PDP11/T03	17995	975	1250	1525
PDP11/23	14700	810	1035	1400
PDP11/34	31800	1650	1880	2550
PDP11/44	42600	2200	3075	---
PDT11/151	8995	445	580	750

WORD PROCESSING

	Purchase Price	12 Months	6 Months	3 Months
WD82 Two-User System				
2 VT100s, 2 Dual floppy discs, Printer	25995	1495	1949	2549

GRAPHIC DISPLAY TERMINALS & DESK TOP COMPUTERS

	Purchase Price	12 Months	6 Months	3 Months
4010-1 11 inch screen	5200	325	375	440
4012 11 inch screen	7500	475	565	650
4013 ASCII/APL	8800	565	660	775
4014-1 19 inch screen	13450	860	990	1150
4015-1 ASCII/APL	15400	990	1165	1360
4016-1 25 inch screen	19500	1250	1450	1650
4631 Hard Copy Unit	4950	310	360	440
4662 X-Y Plotter	4600	285	335	395
4663 "C" size Plotter	11000	710	825	930
4027 Color Graphics	8695	560	660	735
4052 Desk Top Computer	10950	700	825	985
4054 Desk Top Computer	18100	1160	1350	1585

DESK TOP COMPUTERS

	Purchase Price	12 Months	6 Months	3 Months
9845T—Desk Top Computer	23500	1195	1595	1945
9872B—4 color plotter	5000	260	345	410
9895A—Dual floppy disc	6500	350	450	550

Sales Tax Not Included. Prices subject to change.

TERMINALS

	Purchase Price	12 Months	6 Months	3 Months
LA34 DA—Basic Decwriter IV	\$1095	\$ 66	\$ 80	\$ 96
LA34 AA—Standard Decwriter IV	1295	74	92	112
VT100 CRT	1995	95	137	180
LA120 KSR Decwriter III	2495	135	180	225
LA120 RD Decwriter III	2395	130	170	210

LETTER QUALITY PRINTERS

	Purchase Price	12 Months	6 Months	3 Months
1650 KSR—Metalised				
Daisy Wheel	3295	165	220	275
1650 RD—Metalised				
Daisy Wheel	2950	150	199	260
CRTs				
1410	850	55	65	75
1500	1095	74	86	100
1520—Buffered Printer Port	1450	98	110	125
1552—VT52 compatible	1350	82	99	115

TELETYPE TERMINALS

	Purchase Price	12 Months	6 Months	3 Months
743 KSR 30 cps Thermal	1145	80	94	108
745 Portable, EIA & Acoustic Coupler	1595	95	118	140
763 KSR 20k Bubble Memory	2595	130	175	225
765 Portable 20k Bubble Memory	2795	140	195	235
783 KSR 120 cps Thermal	1695	95	123	150
785 Portable 120 cps Thermal	2295	125	165	210
820 KSR 150 cps Matrix printer	2195	120	165	210
820 RD 150 cps Matrix printer	2075	115	156	198

CENTRONICS LINE PRINTERS

	Purchase Price	12 Months	6 Months	3 Months
6300—Model 2A—300 lpm	5995	375	515	655
6600—Model 2A—600 lpm	8425	495	665	850

TECHNICAL OFF-LINE STORAGE UNITS

	Purchase Price	12 Months	6 Months	3 Months
818—Single Cassette	1795	99	132	165
822—Dual Cassette	2295	130	168	210
951—Floppy Disc	1995	110	146	184
981—Floppy Disc with direct control	2395	130	175	220

	Purchase Price	12 Months	6 Months	3 Months
GDC—113—300 baud	275	20	25	30
GDC—103—300 baud	405	25	30	35
GDC—212—1200 baud	875	45	50	55
CAT Acoustic coupler—300 baud	185	11	17	22

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Hospital's Future Begins With Plastic Card

ROYAL OAK, Mich. — The future at William Beaumont Hospital here begins with a plastic card.

The card is one product of the hospital's on-line hospital registration system, which in a recent emergency processed 25 victims of a chlorine gas leak within half an hour, according to Paul S. Peabody, assistant director for corporate services.

"The hospital does not consider the on-line registrations project an end in itself," Peabody said. "To Beaumont it is a beginning — the beginning of a total hospital information system in which department-to-department communications via terminals will be a reality."

Incorporating terminals, CRT screens, computer printers, and elec-

tronic embossers, the real-time system covers the main 940-bed facility in Royal Oak, Mich., and a 200-bed satellite 13 miles away in Troy, Mich.

The nation's 10th largest private hospital, Beaumont Royal Oak outside Detroit recorded 38,200 patient admissions in 1979, with an additional 8,500 at Beaumont Troy, and more than a third of a million outpatient and emergency visits to both hospitals. "At the former 20 to 25 minutes [per] registration, considerable man-hours would have been expended by hospital personnel and patients alike," said Karen V. Guenther, senior systems analyst. Admission now takes two to five minutes.

By 1976, the hospital corporation realized that even maintaining the sta-

tus quo for its growing facility would require increasing registration employees and equipment. A task force of DP and registration personnel began studying alternatives to manual system with batch document processing.

Admissions personnel typed dittoed forms and keypunched plastic patient cards. This system was time-consuming and subject to error.

On-Line System

The task force recommended an on-line registration system and phase-in began in May 1977, coinciding with the opening of the Troy facility. Dual Burroughs Corp. 4700 computers at Royal Oak support the 180-terminal network and an assortment of Burroughs printers and CRT terminals.

By mid-1979, the hospital had developed the software to create 26-part computer-generated registration forms and place 350,000 patient records on three 174M-byte disks. For easy retrieval, a seven-digit permanent number was assigned to each patient file.

"Because user needs were considered strongly in program design, changing over the admitting, emergency room, outpatient and clinic areas at the Royal Oak facility and emergency and admitting at Troy proceeded relatively smoothly," Peabody said.

But the system was still incomplete. The plastic cards used for recording charges and other documents during the patient's stay continued to be produced manually and required additional key punching of charge codes as they accrued.

The manual operation continued until the fall of 1979 when Beaumont acquired 10 AM Addressograph Model 6600 electronic embossers and 92 Model 45 electric im printers for the two hospitals. The necessary software was written and the embossers went on-line in December.

An electronically created four or five-line plastic card travels with each patient. Instead of the past practice of key punching charges onto the card, ward clerks need only slip the card and a form into an imprinter.

"Beaumont Hospital will experience cost savings in equipment leases and supplies of nearly \$30,000 yearly," Peabody said. "And we cannot measure in actual dollars the additional time saved on the patient floors with error-free plastic cards or the public relations value in expediting incoming patients through an extended registration process."

Mini Drives CAP Rescues

(Continued from Page 32)

and (2) asset management and inventory control.

Most personnel financial programs update and tap a comprehensive membership master file or data base.

"The profiles include standard information needed by almost any professional or voluntary organization such as member, name, age, sex, membership category, mailing address and membership anniversary date for billing dues, Charles F. House, CAP's director of data processing, said. "However, in addition, it includes information regarding each member's unit of assignment, a complete record of awards, scholarships, training and experience level."

The complete data base enables CAP to automate membership billing, transfers between CAP units, and changes in membership category. For example, when a young person attains the age limit for cadet status, the computer automatically notifies the individual that he is eligible for senior membership.

Maintenance of unit and wing affiliation in the files simplifies CAP's dues rebate program, House adds. CAP headquarters collects all national and local dues. The computer system automatically tabulates each member's bill and, when paid, the amount of money to be credited to the wing.

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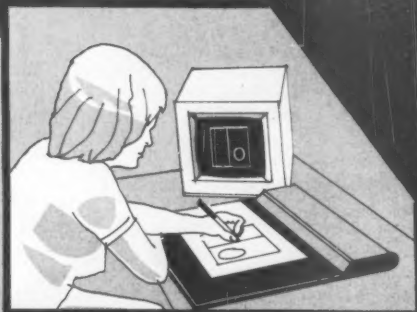


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While Selling 5,000 Toys a Day Net Keeps Shelves Stocked for Toy Store Chain

TAYLOR, Mich. — Circus World Toy Stores (CWTS) saved time and kept its shelves better stocked when it purchased an automated order processing and inventory control system from ADP Network Services, Inc.

CWTS, a specialty chain with 104 stores in 21 states, moved from a batch system to ADP's ADP/Onsite service, an international packet-switched communications network tied to an Ann Arbor, Mich., computing center.

"I was bound and determined that we were going to control our own destiny this Christmas," said Neill Klein, CWTS vice-president. "That means keeping the shelves stocked while selling 5,000 toys a day."

Previous Purchase

Early in 1979, CWTS purchased data collection units for each store. These units allow CWTS branch managers to enter merchandise inventory information on a daily basis through a calculator-like device that automatically stores information on a tape cassette. When CWTS requested proposals from seven vendors to redesign its DP services, they stipulated the collection units would have to be incorporated in the design.

The service combines the advantages of remote computing with the benefits of in-house data processing, according to Klein. Thus, Circus World can use its local system for independent data analysis while employing ADP's network for data transmission. All systems are continuously monitored from Ann Arbor, and both hardware and software are maintained by Network Services' staff.

"Our major requirement in choosing a data processing service was that we

be able to control it," Klein said. "We wanted to inquire into our files and get fast answers. For example, I can find out almost instantly how many Monopoly games I currently have in the warehouse. I couldn't do that before. I would have had to wait for a printed report to tell me a couple of days later, and by then it would probably be inaccurate."

Order Collection

Store managers write their orders based on a printout that tells them what is available during a given week. The managers record their orders on collection units that use tape cassettes. After the stores have closed for the

evening, the units are connected to Bell System telephone answering devices.

Each evening, a program is initiated on the system, which signals a computer in Ann Arbor to dial the phone in each designated store. The phone in the store is automatically answered and the tape automatically transfers the accumulated data to the computer. The data is then transmitted directly from the computer to the Onsite system. It takes only three to four minutes to call all the stores.

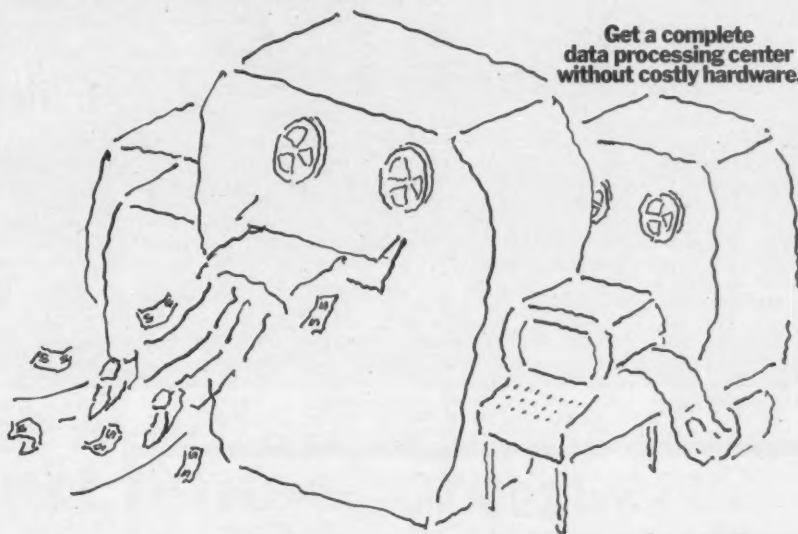
After orders are taken from each store and processed, the system produces the actual shipping labels.

"The labels are sorted in a specific way to enable our staff to quickly pull

the merchandise from its location, get it on trucks and get the trucks on the road," Klein explained.

In addition to the order entry application, the Circus World system incorporates a set of integrated applications including inventory control for over 7,000 items, purchasing, accounts payable, general ledger and sales analysis. The system automatically updates the master files common to all applications while validating the input.

"The service has been fine," Klein said. "With the full support of the ADP MOD center, it's like having my own hardware staff and system programmers — all for the same cost."



Get a complete data processing center without costly hardware.

Meet to Offer Tips On Productivity

CHICAGO — "Improving the Productivity of Technical Resources" is the subject of a two-day conference to be held at the IIT Research Center Nov. 11-12. The featured speakers at the event will be Dr. Robert Potter from International Harvester and Carl Thor of the American Productivity Center.

The conference is being cosponsored by IIT Manufacturing Productivity Center, in cooperation with the American Productivity Center, and the Technological Institute of Northwestern University.

Registration costs \$250, which includes lunches, a reception and all conference proceedings. More information is available from Leon Skan at IIT Research Center, 10 West 35 St., Chicago, Ill. 60616.

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Quadruples Productivity Encyclopaedia Britannica Compiles 50% Savings

CHICAGO — Encyclopaedia Britannica, Inc. (EBI) has quadrupled printing productivity companywide and realized a 50% cost reduction on its largest yearbook since implementing IBM's on-line text management system, Advanced Text Management System II (ATMS II).

Historically, text for the firm's yearbooks was conventionally typed in-house, manually typeset and composed in hot metal on the outside. But, growth rendered this approach increasingly time-consuming and costly.

To speed up operations while reducing costs, EBI converted to computerized text management operations in-house and automated photocomposition on the outside, according to an EBI spokesman.

Conversion was accomplished over several years for all yearbooks except the *Britannica Book of the Year*, the largest and most complicated of the publications, he said.

Consisting of a batch operation in which original text entries and corrections were punched into cards for computer processing, this computerized system increased speed while resulting in considerable cost savings. However, as volume continued to increase, the system reached its maximum in speed and cost improvements because of limitations inherent in batch operations.

Guided by advice from its Computer Services Department, EBI decided to convert from batch to on-line text management operations with ATMS II.

Providing a single-entry, on-line method of preparing, revising and coding text for automated photocomposition, ATMS II is now being used by the publisher to enter composition codes and editorial changes, eliminating the need for complete text retyping, the spokesman claims.

In addition, the advanced text management system is now being used to process text for the *Britannica Book of the Year* which previously had still been typed in-house and manually typeset and composed in hot metal on the outside.

"Conversion to on-line text management greatly speeded up our operations," said Bob Dehmer, manager of editorial typesetting. "For example it reduced the time it takes to make editorial changes from eight days to one day or less. Typically, we can now receive editorial changes up until 3 p.m. and produce revised copy the following morning."

On-Line Efficiency

"Efficiency is also improved," Dehmer pointed out. "Formerly, four separate steps were required to make an editorial correction. Now, this

four-step process is replaced by a single step," he explained.

"One person calls up text on a CRT screen, enters the change and visually verifies its correctness, all in one operation. This on-line approach not only results in greater efficiency but increased entry accuracy since it's easier to see and correct entry errors when they are made on CRT screens."

Costs are also reduced through operation of the text management system he noted. "There was an immediate 50% reduction in costs, for example, when the *Britannica Book of the Year* was converted from conventional to current on-line operations. Installation of the on-line system paid for itself in three months. In

addition, since then, costs have been further reduced an additional 15%."

"We are now processing four to five times the number of pages we previously handled before computerization with the same seven-person staff," Dehmer said. "In addition, we now have the capability to increase our production in the future at minimum or less than proportional cost."

Easy Implementation

Implementation of ATMS II was relatively easy and front end costs, including additional storage and programming, were low, according to Bill Plachy, corporate computer project coordinator. Programming primarily consisted of customizing the text management system to both interface

with and improve the functioning of the previously used batch system.

Operated under CICS in a DOS/V5 environment on an IBM 370/148, the system communicates with seven IBM 3277 video display terminals and prints out on an IBM 3288 line printer.

Now, copy for yearbooks is received from authors and edited as before. But, instead of being retyped on copyfitting paper, proofread, sent out for composition and proofread again in galley form, the edited copy is simply entered directly in a display terminal, printed out with line counts on the line printer and proofread — eliminating second keyboarding and proofreading operations.

Calendar

Oct. 23-24, Houston — **Systems Engineering Applications**, sponsored by the International Federation of Automatic Control. Contact: Prof. Azmi Kaya, Mechanical Engineering Department, the University of Akron, Akron, Ohio 44325.

Oct. 24, Toronto — **Ethical Conflicts and Obligations in Information Processing**. Computer Communications Consulting Co., Suite 701, 17

Queen St. E., Toronto, Ontario M5C 1P9.

Oct. 26-29, Philadelphia — **International Conference & Business Exposition**. Contact: the Data Processing Management Association, 505 Busse Highway, Park Ridge, Ill. 60068.

Oct. 26-29, Miami — **Cash Management Conference**. Contact: Bank Administration Institute, 303 S. Northwest Highway, P.O. Box 500, Park Ridge, Ill. 60068.

Oct. 27-28, New York — **Voice Mail Symposium**. Contact: Business Communications Review, 36 S. Washington St., Hinsdale, Ill. 60521.

Oct. 27-28, Toronto — **Canadian Data Processing Education Conference**. Contact: Canadian Pacific Ltd., 20 King St. W., Toronto, Ont. M5H 1C4, Canada.

Oct. 27-29, Nashville, Tenn. — **Conference for Computing Machinery**. Contact: Association for Computing Machinery, 1133 Ave. of the Americas, New York, N.Y. 10036.

Oct. 27-29, Washington, D.C. — **SNA Compatibility Workshop**. Contact: Telecom Computer Technology International, Inc., 599 N. Mathilda Ave., Sunnyvale, Calif. 94086.

Oct. 27-29, Washington, D.C. — **Wideband Communications Systems**. Contact: George Washington University, School of Engineering and Applied Science, Washington, D.C. 20052.

Oct. 27-30, Atlanta — **International Conference on Computer Communication**, sponsored by the International Council for Computer Communication. Contact: Computer Communication Executive Committee, P.O. Box 280, Basking Ridge, N.J. 07920.

Oct. 27-30, Los Angeles —

Structured Systems Analysis and Design. Contact: Oberland Associates, 4036 N.E. Sandy Blvd., Portland, Ore. 97212.

Oct. 27-31, Chicago — **Compsac 1981**, sponsored by the Institute of Electrical and Electronic Engineers. Contact: Compsac, P.O. Box 639, Silver Springs, Md. 20901.

Oct. 27-31, Wellesley, Mass. — **Systems Design Workshop**. Contact: Q.E.D. Information Sciences, Inc., 180 Linden St., P.O. Box 181, Wellesley, Mass. 02181.

Oct. 27-31, New York — **Structured Systems and Analysis Design**. Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Oct. 27-31, Brussels, Belgium — **Understanding Computer and Controls**. Contact: Arthur Andersen & Co., Center for Professional Education, 1405 Fifth Avenue, St. Charles, Ill. 60174.

Oct. 28-30, Chicago — **Designing, Installing and Managing an International Telecommunications Private User Network**. Contact: Telecom Systems Group, 579 Pompton Ave., Cedar Grove, N.J. 07009.

Oct. 28-30, Los Angeles — **Interface West Conference and Exposition**. Contact: Interface West, 160 Speen St., Framingham, Mass. 01701.

Oct. 29-31, Chicago — **Computerized Office Equipment Expo**. Contact: Industrial & Scientific Conference Management, Inc., 222 W. Adams St., Chicago, Ill. 60606.

Oct. 30, New York — **Computer Graphics for Business Charting and Mapping**. Contact: AUI Data Graphics, 1701 K St. N.W., Washington, D.C. 20006.

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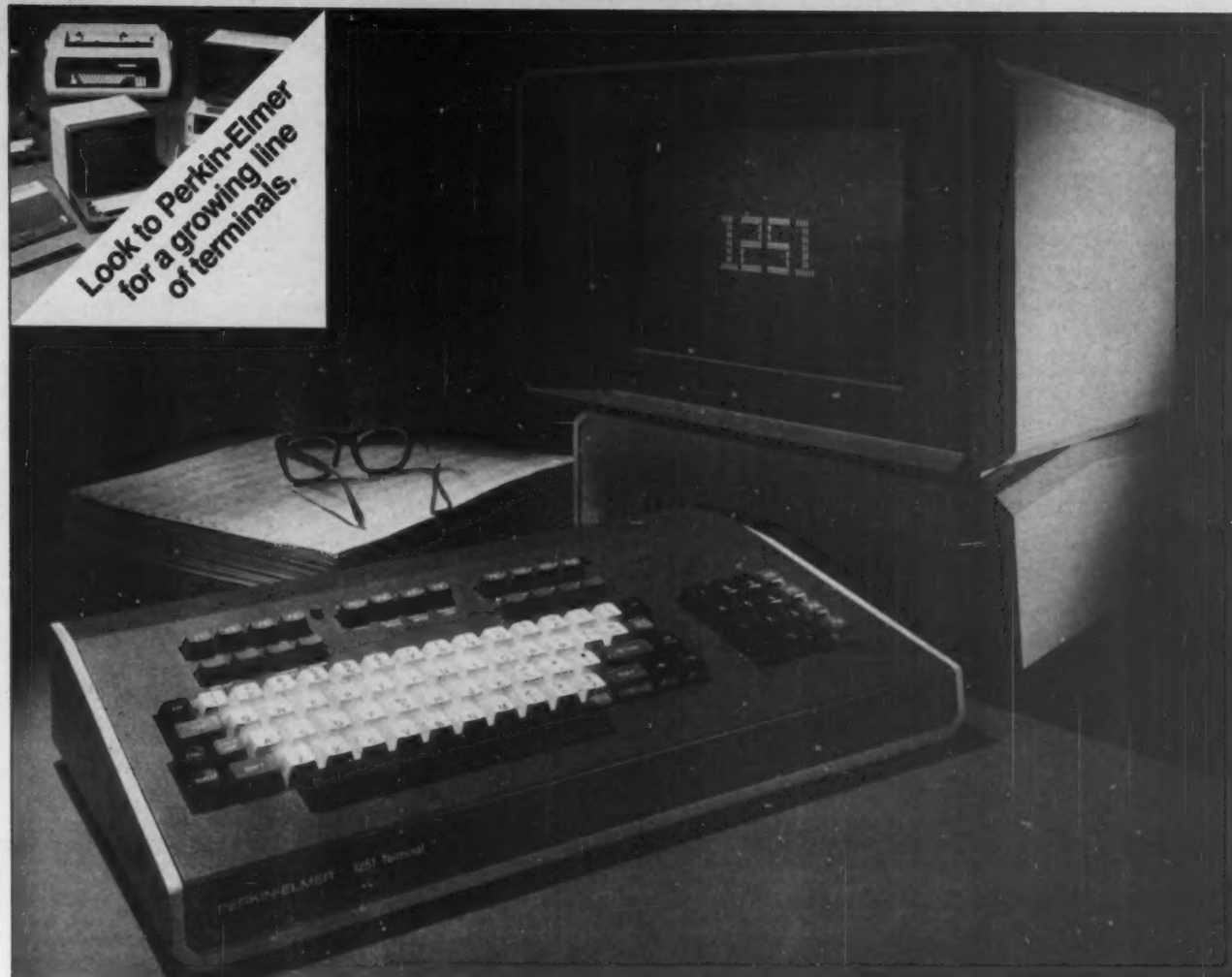
COBOL GLOSSARY — Input is a sequential file containing all your COBOL source programs. Output is up to nine reports showing (1) all data fields showing every statement where each one is used, (2) all literals showing every statement where each is used, (3) an alpha list by program showing the REMARKS section of each one, (4) all programs using each device, (5) all programs using each file, (6) all programs which copy each SSL book, (7) all programs which include each SPM module (for users of IBM's SPM), (8) all programs which CALL each sub-program, (9) all statements where any COBOL RESERVED WORDS are used which violate your shop's standards. \$99 per year or \$395 one-time charge.

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Results of Low-Cost Systems Surprise Testers

By Hillel Segal

Unexpectedly, the lower cost computers in the less-than-\$15,000 price bracket equaled and even outperformed systems in the \$15,000 to \$25,000 range. These were the results of the accounts receivable benchmark test performed by the Association of Computer Users (ACU).

However, superior speed in mathematical calculations put the more expensive machines out in front in the scientific/engineering problem.

The benchmark reports, produced for the ACU by independent consulting firms, are a set of standard programs in Basic. As noted in last week's column, they cannot be used by themselves in selecting a particular piece of equipment from the many offerings available. Benchmark tests are a significant advance in the comparison of hardware and operating systems, but they do not address the usability of applications software which often is a main consideration when purchasing a computer system.

Having reported on a total of 18 systems in *Computerworld* so far, we are in a position to compare half of the less-than-\$15,000 systems in our Series 1 with the entire group from Series 2, which covers computers in the higher price range. One caveat should be added to the standings shown in the scorebox. Some systems (as noted) used compilers or semi-compilers. Their test results would be faster if run-times only were being listed for them, rather than combined compile/run-times.

In this column, we will briefly discuss the results of testing the six systems in the first half of Series 1. Naturally, we cannot go into much detail in this short article; and readers are referred to the actual benchmark reports for a fuller discussion of the findings.

Six Systems

- **Texas Instruments, Inc. TI 771** — The 771 gave a solid performance and was neither first nor last in any speed test. It did lead in the ease-of-use test. Users need to be technically oriented if purchasing through TI. Otherwise, an OEM-supplied unit with software should be considered. Incorporating the TMS 9900 microprocessor with 64K bytes of memory, the system is rounded out with dual floppy drives, CRT terminal and printer. TPL is offered, but Basic is the primary language. It costs \$12,100.

- **Pertec Computer Corp. PCC 2000** — Users characterized this system as "friendly" — a good starter system for the first-time user. Hard disk expansion and multiple user abilities are also offered. Its speed was not outstanding, but it did better than some more expensive units. With 64K bytes memory, two mini-diskette drives, CRT and printer, the PCC 2000 is priced at \$12,270. A CP/M operating system is used, allowing acquisition of Fortran, Cobol and other languages in addition to standard Basic.

- **North Star Computer, Inc.'s Horizon** — Outstanding performance in a low-cost system characterized the Horizon's benchmark testing. In accounts receivable, the system's times beat all of the higher-priced computers tested. But users need to find a sepa-

SCOREBOX

Series 1 Results Systems up to \$15,000

	C-1 Scientific/- Engineering Time	C-3 Accounts Receivable Time
Pertec PCC 2000	25:48.4	6:04.3
North Star Horizon	12:01.9	1:57.7
Cromemco System Two	14:52.6	2:48.0
Texas Instruments 771	22:05.4	3:38.1
Vector Graphic System B	19:30.0	5:56.5
Decstation 78	22:35.6*	5:04.8*

Series 2 Results Systems \$15,000 to \$25,000

	C-1	C-3
IBM 5110	29:47.2	4:11.0
Wang 2200VP	2:05.8	3:20.0
Texas Instruments FS990/10	**	3:18.6
Hewlett-Packard System 45	4:38.9	5:05.8
DEC PDP-11V03	14:43.4	4:14.0
Q1 Lite	6:50.7*	5:03.3*
Univac BC/7-610	12:09.2*	10:37.0*
Northern Telecom 405	**	***
Datapoint 1170	38:27.5	6:50.4
Randal 100	13:52.4	10:05.0
Hewlett-Packard 250	4:05.9	4:45.7
Texas Instruments DS990/2	**	2:48.3

*Results include both compile and run-time.

**Test could not be run because of memory limitations.

***Test could not be run because of formatting limitations.

rate software-oriented vendor, unless in-house expertise is available, because the Horizon is not a "ready-to-go" package system. It includes 64K memory, printer, Basic and floating-point board, dual minidiskettes and can be used with most CRT terminals. Total system cost was \$6,911. Pascal is also offered, and the CP/M operating system is available.

- **Cromemco, Inc. System Two** — The System Two also showed leadership in the benchmark timings, with a second-of-six showing in two applica-

\$6,400, the System B was the least expensive unit tested. Benchmark times were respectable in this price class, and upgraded versions with 8-in. floppy disks (said to run 4 times faster in disk I/O) or 32M-byte Winchester (running 10 times more quickly) are available without sending the price beyond \$12,000. Three operating systems are offered, and languages include Basic, Pascal, APL, Fortran, Cobol and Assembler. The System B tested came with 64K memory, CRT, minifloppies and Qume Corp. printer for \$7,750.

This is the 20th in a series of articles giving the highlights of benchmark tests conducted on popular small computer systems. The full reports were originally published by the Association of Computer Users, a 4,000-member nonprofit organization.

tions problems. The more expensive Winchester-disk version (the Z-2H) was also tested and topped the list in the accounts receivable problem, which uses numerous disk access steps giving the faster hard disk an advantage over floppy-equipped competitors. Basic, Fortran, Ratfor, and Assembler are available. RPG-II and Lisp have also been announced. The System Two includes 64K memory, 180 char./sec printer, dual minifloppy drives and a CRT terminal. It costs \$9,275.

- **Vector Graphic, Inc. System B** — Configured with the newly available dot matrix printer at a cost of about

- **Digital Equipment Corp. Decstation 78** — Primary strength of the Decstation 78 was its easy-to-use operating system and business software. Users gave both DEC service and software very good reviews, and satisfaction with OEMs was also widespread. The Basic tested was a semi-compiled version, and compile times included in the result should be taken into account. On-location data entry and retrieval is a primary application for the system, and communications capabilities are good. With 32K six-bit bytes and dual diskette drives, the system came with CRT station and 180 char./sec printer for \$11,570 at DEC com-

puter stores. Price from the factory or OEMs would be higher.

Future Testing

While the results to date show that David can indeed slay Goliath — at least sometimes — the showdown between higher-priced business computers and inexpensive do-it-yourself computers is not over. In future issues of CW, we will be reporting on tests of less-than-\$15,000 computers by Apple Computer, Inc., Radio Shack, Digital Micro Systems, Inc., Data General Corp., Alpha Micro, Inc. and Ohio Scientific, Inc.

Not every businessman will want to abandon IBM for the TRS-80, but for the first time we will see if the super-inexpensive systems are really all that bad in the performance category. Early findings indicate speed is not closely related to price, except in number-crunching operations.

Perhaps the most startling result of the Series 1 benchmark tests is the six-system average for the accounts receivable problem. It is lower than the 12-system average for more costly Series 2 systems.

What is more, the top performer in this same test for all 18 systems was a computer costing less than \$7,000! Although these results are surprising, they reveal that only an actual test of performance can bring to the surface the combined effects of processor speed, disk access time and other factors that relate to throughput. If speed were the only criterion, there would be little reason to spend more.

In publishing these findings, we leave the reader much of the responsibility for using the results properly. But we think this is where the proper responsibility should be. Our primary concern is that the tests be accurately and fairly conducted. While good benchmark reports do not imply suitability for a given application, they provide a starting point for the comparison of systems. It is up to the user to know what features his computer must have, or to rely on trustworthy advice.

About the Author

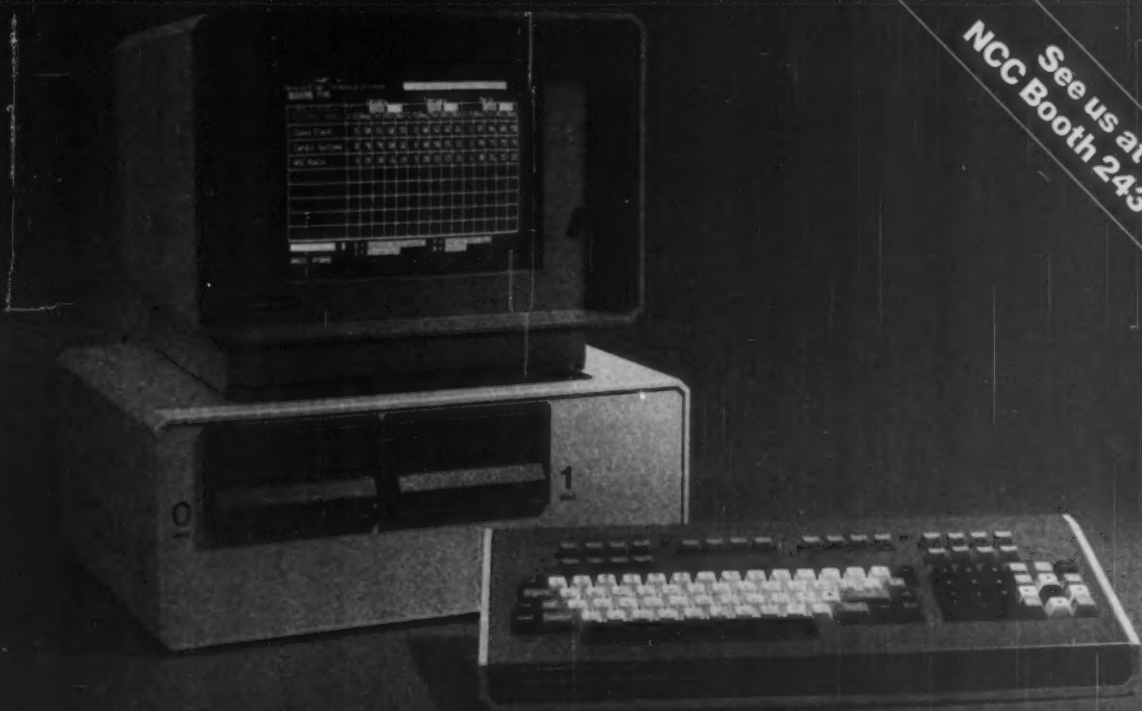
Hillel Segal is president of the Association of Computer Users (ACU), a nonprofit association with members all over the U.S., Canada and several other foreign countries.

One of the association's key activities is the publication of its "Benchmark Reports." Each month a new report is produced covering another computer system.

In addition, ACU publishes seven bimonthly newsletters for users of small computers, midi computers, large computers, time-sharing systems, distributed processing systems and word processing systems and home and hobbyist computers.

A complete set of sample copies of each of ACU's newsletters and complete information about membership in ACU is available from the ACU at P.O. Box 9003, Boulder, Colo. 80301.

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EDITORIAL

Don't Hold Your Breath

Don't hold your breath waiting for AT&T's newly proposed Wide-Area Telephone Service (WATS) rates to be implemented. Although 90% of those who presently subscribe to the service are in line for lower charges, it is doubtful the tariff will go into effect on Dec. 14, the date specified in the telephone company's filing. That's because the remaining 10% will have to pay higher charges costing them several million dollars. Most of America's largest corporations are in this latter group, and they are certain to oppose the new WATS tariff vigorously.

The Federal Communications Commission's (FCC) rules allow for a conditional implementation of new rates under such conditions. The tariff goes into effect, but records are kept of the increased charges paid by individual customers. If the rates are ultimately reduced, the records generate refunds. But this scheme isn't likely to work in the case of the WATS tariff.

Companies like U.S. Steel, Ford Motor Co., General Motors and Westinghouse won't willingly fork over millions of dollars to the phone company, even temporarily, without a fight. It isn't just the direct outlay that bothers them. They are certain to argue that the new AT&T tariff will require substantial reconfiguration of their existing networks and massive changes in the related operations.

If the FCC isn't persuaded by these arguments and allows the WATS tariff to become effective, the companies probably will seek, and obtain, a court injunction delaying imposition of the new rates for several months.

There is some chance — but not much — that if this happens, users with relatively small traffic volumes will still be able to obtain WATS service at reduced rates.

Pending before the commission, along with AT&T's new rates, is a proposal to allow sharing/resale of WATS on a test basis. The commission was scheduled to act on this matter late last week, shortly after *Computerworld's* press deadline. If resale/sharing is allowed on the basis of the present rates, specialized carriers like MCI Communications Corp. could lease WATS circuits at bulk rates and resell them to customers who don't have enough traffic to qualify for bulk rates on their own. The resale charges would be higher than the bulk rates, but lower than toll or leased private-line charges, in many cases.

The trouble is that AT&T violently opposes resale/sharing based on the present WATS rate structure; this was one of the reasons for filing a new tariff.

A popular pastime, when impasses like this arise, is to criticize the FCC for unnecessary red tape and delay. While the commission is hardly a model of administrative efficiency, the complaint is really irrelevant.

Delays are inevitable when communications tariffs and policies are established through an adversary process. Since this process has led, over the past decade, to substantially lower rates, many new services and much-improved technology, it has benefits as well as drawbacks — a point which the critics invariably overlook.

Maybe the red tape would be reduced if the government made the big decisions unilaterally. But it isn't likely the critics would consider that arrangement an improvement.

DATA PAST

Five Years Ago
Oct. 8, 1975

WASHINGTON, D.C. — Problems with a computerized payment system designed to issue checks to recipients who qualified for the Supplemental Security Income (SSI) program were blamed for more than \$403 million in overpayments over a period of 18 months.

Eight Years Ago
Oct. 4, 1972

WASHINGTON, D.C. — Federal labor officials projected an excellent job market picture for systems analysts in the 1970s. According to statistics from the Labor Department's Bureau of Labor Statistics, there would be an average of 22,700 openings for systems analysts per year to 1980.



"Whaddaya mean, we can't make you join our union? You think maybe you're in Poland?"

LETTERS

Managing From Home

I read "Remote Terminals May Replace Commuting" [CW, Sept. 15] with interest because of a recent incident. As the result of an accident, my system manager found himself the subject of an extended stay at home following surgery. Things can get pretty sticky without him on the job because we have a small department and little backup capability.

The second day he was home, I sent him his CRT terminal with an acoustic coupler and a telephone credit card. He subsequently managed the system for three weeks from his home.

In this instance, everyone benefited from the arrangement. The system kept going and deadlines were met. The system manager saved his sick leave for when it might "really" be needed. In addition, his time spent watching the "tube" concentrated on the "Ascii Show" rather than "As the World Turns."

I am not sure that this could work in every instance, however. Its success in our case was dependent upon several factors:

1. My system manager is a highly motivated, intelligent individual who could be relied upon to work alone.
2. The communications system (in our case, Telenet) was in and operating at the time of the accident.
3. There was sufficient personnel backup on-site for those tasks which required "hands-on" manipulation. Tasks for which there was no backup were able to be delayed without detriment.

I am thoroughly satisfied with the way this situation worked out. I would do it again without hesitation.

Glenn S. Orenstein

Boston, Mass.

In Poor Taste

Regarding "Climate Control Malfunction Annihilates Laboratory

Mice" [CW, Sept. 8], I find the comparison of the deaths of some laboratory mice to the tragic deaths of several hundred men, women and children to be in extremely poor taste and unbecoming of a newsweekly of *Computerworld's* caliber.

Mark H. Deibert

E. Brunswick, N.J.

Substance of Structure

Congratulations on publishing the first intelligent commentary on structured coding that I can recall. I am referring to Peter Lacey's article, "Structured Coding's Twin Myths" [CW, Sept. 8].

After all the mindless babble about GOTOs, nested IFs and indentation of paragraphs — after all the examples and counterexamples of structured code and the resulting crossfire of criticism — finally, an article that demonstrates some understanding of the substance of structured coding!

I would hope that Lacey's article sinks the structured programming debate into the same obscure swamp as yesteryear's modular programming controversy.

Incidentally, structured design not only provides the foundation for structured programming, it also provides an answer to the question: "What is a module?"

Kathlyn E. Doty

Maywood, Ill.

(Other letters on pages 42 and 43.)

Computerworld welcomes comments from its readers. Preference will be given to typed, double-spaced letters of 150 words or less. Letters should be addressed to Editor, *Computerworld*, 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.

SOFTLINE/Werner L. Frank

Software Production Still a Problem

A recent report to Congress by the Comptroller General Accounting Office (GAO) report FGMSD-80-4, Nov. 9, 1979 cited the continuing problem of developing software within the federal government. The report title summarizes the issue: "Contracting for Computer Software Development - Serious Problems Require Management Attention to Avoid Wasting Additional Millions."

The report reflected the views of 163 software contracting firms and 113 federal government project officers, as well as experience with specific contracts for software development. The indictment, as summarized herein was

severe:

- Dollar overruns are fairly common in more than 50% of cases.
- Calendar overruns occur in more than 60% of cases.
- Of the nine contracts examined (admittedly eight of which were in trouble), of \$6.8 million expended, the results yielded:
 1. Software delivered, but never used: \$3.2 million.
 2. Software paid for, but never delivered: \$1.95 million.
 3. Software extensively reworked before use: \$1.3 million.
 4. Software used after changes: \$198,000.
 5. Software used as delivered:

\$119,000.

As the report concluded, "The government got for its money less than 2% of the total value of the contracts."

Can software development still be that unpredictable and troublesome in this age of enlightened practitioners who have access to higher order languages, sophisticated operating systems, a variety of implementation tools and various structured procedures and disciplines?

The report went on to cite some causes for the problems identified above:

- Lack of specific contracting skills for soliciting and subsequently administering software efforts.

- Premature rush to develop systems before adequate requirements analysis is completed.

- Tendency to commit to the entire project without proper planning or defining check points.

- Tendency to ignore final inspection and test conditions and related acceptance procedures.

The report also identified some popular observations of the software process including:

- Projects cost more and run larger than expected.

- The production system usually ends up as a "prototype" system.

- The ultimate operational system is often achieved after fixing the prototype at a cost equal to or greater than the initial development itself.

The GAO called for action by the federal government to remedy the situation by suggesting that specific guidelines be generated which would assist agencies in custom software development. In this regard, the report provided a provisional checklist of items that can serve as a basis for a more comprehensive attack on the problem.

Is Organization Enough?

But can better organization in itself, by the federal customer or any other software purchaser, really impact the fundamentals that operate in software construction?

We regrettably conclude that the customer's organization and procurement process has little influence on these factors.

So what can be done? I submit that the single most important and influencing step that can be taken when

(Continued on Page 46)

HUMAN CONNECTION/Jack Stone

On Productivity: Truth Bears Repeating

It's always reassuring to know that some *Computerworld* readers agree with one's opinions, particularly if those opinions can be evaluated on some objective basis, like dollars — won or lost.

This was the case with William A. Delaney, president of the Bedford, Mass., software firm, Analysis and Computer Systems, Inc., who wrote a strongly supportive letter about my views on programmer productivity and efficiency [CW, Sept. 1]. He has been using the management-by-objectives (MBO) approach for years and feels it is the most cost-beneficial approach around.

Delaney first put the "lines of code" measurement into a welcome perspective:

"I am in complete agreement with you that measuring lines of coding per programmer per day and then deciding that those who produce the most are, ergo, the best, is at best an exercise in frustration and, at worst, outright misleading.

"Using this one criterion is the same as saying that the author who writes the longest article is the best writer. Indeed, in such cases, the shortest article or speech that covers the essentials and successfully delivers the message is, in my book, the best.

"As Shakespeare said, 'Brevity is the soul of wit.' Brevity is also a most desirable characteristic for any analyst or programmer. If five well-thought-out instructions will do the job, then why use 15 or 20? That is inefficient. There is no good reason unless your organization is counting your lines of coding per day and judging your performance on how many lines you write — not what you accomplish.

"We do, however, keep track of instructions per day... and use this information in estimating costs for new (programming) jobs and projects before we start on them. This (statistical) information can be surprisingly accurate (within 10%) when you have a large enough data base to use from which to extrapolate your costs and create schedules."

Delaney also talked to the MBO point:

"As you said, the management by objectives approach is by far the best

method of getting the jobs done in the shortest time and at the least cost. At least this has been so at our company, because we have been using this method for over 15 years and we will continue to do so until someone comes up with a better way."

Delaney next summarized the basis for projecting his schedules and costs and discussed the problems of "premature" coding:

"For our work, programmers spend their time as follows: analysis and design, 40%; coding, 20%; checkout and test, 30%; documentation, 10%.

"We have learned that every day spent in analysis and design saves about five days in checkout. The tendency to rush into coding before you really know what you are doing comes

back to haunt you later on. Premature coding generally results from yielding to customer (or user) pressure to 'get some work done,' because some clients don't believe that you are really doing the job unless and until they see you and your staff writing and checking out lines of coding.

"Premature coding will surely increase the number of lines of coding programmers turn out, because they will do it once, then find it needs substantial revision and do it a second time correctly. This is hardly an efficient method, but it can be most rewarding to the programmers if their performance is measured solely by the lines of coding they write."

Delaney went on to comment about

(Continued on Page 46)

SOCIOLOGY OF COMPUTING/Miles Benson

The Small Compromise

Ted R. had been purchasing computing services for Alchemy Chemical for almost 10 years.

He had bought software, hardware, keypunch support and consulting services. If it was related to data processing and it was for sale, Ted knew how to get it. And in an era when computer crime was beginning to be a concern, Ted was as clean and unbenet as the Straightarrow Turnpike which ran past Alchemy's front doors.

Not that he hadn't been tempted. Marketronics had been so anxious to place a new 3PI computer at Alchemy that it had offered him a General MPG Tomcat Landau Town Car. Software Support Services wanted Alchemy to buy its Linkluster data base management system and had sent him a Rollei camera in the mail (he'd sent it back).

But as Ted moved into his second decade in computing, the temptations began to seem unbearable.

When Alchemy decided to automate the production of one of its major product lines, process control

computers were called for. Lots of them. And Ted, of course, was put in charge of the procurement.

The wooing of Ted R. began soon enough. No, I couldn't fly to Hawaii (Why not? I've never been there). Yes, I'll drink your Scotch, but no, I won't accept your case of bottles (but it's top quality Scotch).

Crisis Escalates

Wrestling with his conscience left him physically exhausted each nightfall. Locked in tandem with his psychological stress, his health began to degrade nongracefully. The crisis was escalating.

It was while the competitors from Minimax were in town that Ted began to see a way out. Minimax came from London. What if... what if... and it was hard for Ted to even formulate the thought. What if somehow Minimax managed to win the competition? Fair and square, of course. Then there would be plenty of company-paid travel to Europe. Maybe he could even take his wife along. And it would all be — er — le-

gitimate. After all, it would be Alchemy putting up the travel money, not a vendor.

Except, of course, that Minimax had to win. It was such a small compromise, and such a large ethical payoff. And no one but Ted would ever know.

The evaluation of proposals went smoothly. Ted rated each proposal against a predefined set of technical criteria. When all the individual scores were in, weighting factors would be applied to adjust for the relative importance of the criteria and then total scores computed. Minimax, as he suspected, had an excellent proposal. Just two weighting factors had to be changed, and only by a few percent at that, to swing the competition Minimax's way.

The contract award was big enough that *Computer Trends* carried a small article on it. British statemen, concerned about their ever-faltering economy, expressed plea-

(Continued on Page 46)

Whistle-Blowing

I am occasionally consulted by junior employees concerning "whistle-blowing"—that is, should the employee or "a friend of his" tell management about some observed illegal, unethical or dishonest action on the part of another employee or manager. I have not found it easy to respond to these inquiries because it is my experience that a company's high principles are not always universally respected by management practice. Often, the further down in the management chain one goes, the larger the divergence between principles and practice. Consequently I was delighted to discover an article in the MIT *Technology Review* which deals with the dangers of whistle-blowing and to which I can now refer inquirers.

Since it is likely that other *Computerworld* readers receive similar inquiries

and have had the same difficulty in deciding how to give advice, I have prepared the following abstract of the article and suggest that readers consider advising whistle-blowers to read "Dos and Don'ts for Whistle-Blowers: Planning for Trouble" by Peter Raven-Hansen, *Technology Review*, May 1980.

The paper does not address the moral and ethical question of whether a person should blow the whistle or the legal question of his right to do so without penalty, but instead discusses how to blow the whistle once a person concludes that he is morally compelled to disclose information about fraud, corruption, mismanagement or hazards. It expands on four basic rules for defen-

sive whistle-blowing:

- Focus on the disclosure itself, not on personalities.
- Use "channels" before going public.
- Anticipate and document retaliation.
- Know when to give up.

The article suggests that "whistle-blowing is lonely, unrewarded and fraught with peril. It entails a substantial risk of retaliation which is difficult and expensive to challenge. Furthermore, 'success' may mean no more than reinstatement to a job where the bridges are already burned, or monetary compensation that cannot undo damage to a reputation, career and personal relationships."

The best and shortest advice on how to blow the whistle has probably been given by one of the first whistle-blowers. He says that if he had to do it all over again, he would do two things at the onset: line up a good lawyer and line up a good job! The would-be whistle-blower who cannot do both should plan for trouble and blow the whistle defensively.

Eric A. Weiss

Springfield, Pa.

From Whence They Come

The last paragraph of the editorial "Standards of Avarice" read, "IBM sets high standards on a corporate level, and it's time it started enforcing them in the field" [CW, Sept. 1].

Quoting from the fourth paragraph, "IBM allegedly brought in higher level executives whose job was to pressure the DP director's boss." Where do you think they come from? Corporate, of course!

One who's been there.

Gene Framel

Tulsa, Okla.

Stress 'Real' News

Computerworld's continuous attacks on IBM and others using sensational headlines and negative attitudes does nothing but decrease CW's journalistic standing. Sensation may sell on the newsstands, but most of CW's sales are by subscription to professionals.

Don't ignore the negative stories, but make your articles more upbeat and stress the "real" news, all the fantastic new developments and products in the industry of the future. Your readership will welcome the change.

James Edwards

Shawnee Mission, Kan.

Perpetuating a Myth

I read with interest the articles on structured programming and structured methods in the Sept. 1 issue. I was disturbed to read the opinions expressed in the "worst case" example by a "technical specialist with some 10 years of application programming and design experience." Unfortunately, his opinions perpetuated the myth of structured programming meaning "no GOTOs" and therefore resulting in nested IFs.

While I concede that no GOTOs does in fact mean that the use of nested IFs becomes necessary, surely these days nobody still maintains that structured programming means an elimination of branching. Edsger Dijkstra made this clear way back in 1964 and again in 1968. It appeared that nobody understood him then and disturbingly it appears that nobody understands him now.

David King

Glendale, Calif.

If Churchill had used SPSS, he might have saved his statistical department a lot of blood, sweat and tears



In waging war... and business... great executives know that good data analysis is a matter of life and death. Winston Churchill knew it:

"One of the first steps I took on taking charge of the Admiralty... was to form a Statistical Department of my own—(one that I) could trust to pay no attention to anything but realities. This group was able to present me continually with tables and diagrams illustrating the whole war. I (therefore) had from the beginning my own sure, steady source of information, every part of which was integrally related to all the rest." (*The Gathering Storm*—pp 467-68)

Thanks to the honest and tireless efforts of his Department, most of the war's

critical decisions were based on facts, not hunches. Had they been able to use the SPSS Data Analysis Package, the Department's analysts could have explored the legions of data more quickly, efficiently, creatively... with easy-to-generate tables, graphs and reports, as well as sophisticated statistical analysis.

Using the SPSS Graphics Option, Churchill might have had graphs showing The Battle of Britain in terms of German and British aircraft losses by time. Using regression

analysis, Churchill would have had an excellent estimate of future losses.

As a matter of fact, Churchill might have been able to do it on his own, without the Department, because SPSS is so easy to use. Churchill himself could have learned from the excellent SPSS self-teaching manual. No special training in computer language would have been necessary—SPSS talks, listens and reports in the user's language: plain English!

When you decide which data analysis software

package is right for your life and death decisions, consider the facts, as Churchill would have done. SPSS is sophisticated in output, yet simple to input. It's extremely portable—works in almost all computer environments. And you needn't hire any extra data processing people—your data researchers work on their own... with considerably less "blood, tears, toil and sweat."

If you would like to see how SPSS-generated graphs and charts would have displayed The Battle of Britain to Churchill, or for more information on SPSS, call or write:

Roger Sack
SPSS, Inc.
Suite 3300 Dept CW9-80
444 N. Michigan Avenue
Chicago, IL 60611
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Missed the Point

No wonder Al Volpe is down on structured programming ("Worst Case," CW, Sept. 1). He has completely missed the point! Structured programming is not writing programs without GOTOs, nor writing programs with nested IFs. Structured programming is simply writing programs in a clear and organized fashion, thereby avoiding mistakes and at the same time making the programs easier for others to read, understand and modify.

The objection to the GOTO is that it makes it too easy for a programmer to obscure the logic of his program. This doesn't mean that programs with GOTOs are bad, and it certainly doesn't mean that programs without GOTOs are good. It is, in the words of E.W. Dijkstra, who started the whole thing, "the unbridled use of the GOTO" that is harmful.

Further, the pseudocode example published with the article is a case structure; it should be implemented with a series of independent (but linked) IF statements, like this:

```
IF condition-1
  PERFORM PARAGRAPH-B
ELSE IF condition-2
  PERFORM PARAGRAPH-C
  .
  .
  .
ELSE PERFORM ERROR-HANDLER.
```

This is not a nested IF; it is a bunch of individual IFs strung together. The programmer need only consider one of them at a time. If one ignores Volpe's suggestion that conditions be arranged "in descending order of importance" and instead puts them in some logical order (such as alphabetical by transaction type) then one can string together dozens or even hundreds of IFs without confusion. The only possible penalty is a few microseconds of machine time.

Note also that this form forces the programmer to consider the "none of the above" situation, which was omitted from Volpe's example.

Volpe suggests operating "directly with the user department" as an alternative to program walk-throughs. This shows a fundamental misunderstanding of the purpose of the walk-through. Each of us has from time to time asked a colleague to review a program which was giving us trouble. The principle here is that a fresh look can often reveal problem areas which went unnoticed by someone "too close" to the problem.

By the way, Newton's work on actions and reactions was in the field of mechanics, not thermodynamics.

Bob Brown

Atlanta, Ga.

Strong Responds . . .

The recent letter "Free-Lancers Defended" [CW, Sept. 1] raised some interesting points regarding contract programmers vs. contract houses.

Aid M. Horton stated the case for free-lancers very aptly. However, there are some questions in the arguments presented by Aid.

Initially, I will restate my original position [CW, Aug. 18] that many free-lancers are excellent. However, the client cannot always be sure of that and thus, "Buyer beware."

There certainly should be a retraction of Aid's statement that contract houses send out "experienced" [average three months] programmers to serve their

clients. Aid must realize that contract houses exist on multiple assignments at multiple companies, and satisfaction must be guaranteed to sustain their existence.

Should Aid's statement about not meeting a free-lance programmer who could not get or hold a job be true, then Aid professes "All free-lancers are excellent." I can only assume that to believe this, one must function in a very sheltered environment.

Regarding turnover statistics that Aid mentioned, nationally, turnover is 35% per year within data processing staffs. This statistic means that one-third of the data processing staff will turn over every year; there will not be a complete turnover every 10 months,

as Horton stated.

However, companies that rely on independent contractors heavily have a much higher turnover rate than the norm. The reason for this is that in-house employees become envious of their free-lance counterparts who do not put in as many hours, do not have the same career concerns with the job and do not concern themselves with successful completion of each task. Yet, the employees make half as much money as free-lancers.

Aid further stated that it is nearly impossible to get an ex-employee back to make a correction or change to a system. It is in fact almost as hard to get an independent back during prime shift hours. Only a contract house

could supply the right answer.

Finally, the Independent Computer Consultants Association (ICCA) is to be complimented on taking the first of many steps necessary to promote professionalism within our industry. However, it cannot ensure reliability of the free-lancer's product, nor can it ensure the technical competence of its membership.

The ICCA monitors members with a code of ethics. Under "Professional Competence," it states: "A member shall not undertake or continue any consulting assignment which he/she cannot reasonably expect to complete with professional competence."

No doubt, this is difficult to monitor and a good reason for the old adage, "Buyer beware!"

Alan Strong
President

Contract Personnel Services
Los Angeles, Calif.

LETTERS

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THE TAYLOR REPORT/Alan Taylor

Arbitration Group's Procedures May Hurt User

The NCR Corp. arbitration clause, praised by that company as helping users, has now resulted in a vendor's employee being made arbitrator in an NCR-vendor dispute. Weak American Arbitration Association procedures permit this conflict-of-interest situation, although the user in question, Perl-Mack Enter-

prises of Denver, doesn't welcome it.

Further hampering Perl-Mack in being able to fully present its case against NCR is the prematurely agreed-upon timetable, which calls for any disputed subpoenas, documents and so forth to be delayed until the start of the three-day hearing in Novem-

ber. This is expected to be the only time that will be available to Perl-Mack. Problems could arise since witnesses not wanting to appear, for instance, can simply go out of touch for a short time, and so their evidence cannot be counted upon in the planning.

The current dispute involves an NCR contract for a com-

puter system, including terminals, and the user is asking for printed contract terms to be overwritten by various state laws. The arbitrator, Kevin M. Mahan, revealed in a letter to *Computerworld* [Sept. 15] that he is employed by another computer terminal manufacturer. This demonstrates the dangers of the American

Arbitration Association's procedures, particularly when used in conjunction with the NCR Universal Agreement.

The clauses Perl-Mack wants thrown out are a common feature in every hardware contract I know, and presumably in that of Mahan's employers. (At their request I have not investigated this point. They take the reasonable position that they do not want to be involved further.)

NCR Clause Restriction

The dangers for an NCR buyer start with the arbitration clause the vendor insists upon. It is an unusual one, calling for the arbitrator to be knowledgeable about both business and computers. However, it ignores legal knowledge, which is needed to determine if any of the contract terms are improper.

The result of this clause is that arbitrators are restricted to a group which often, like Mahan, have employers in the business or who are in the business for themselves. In either case, such people have the validity of their own form contracts to consider!

Such employer interests are not caught by the American Arbitration Association's conflict-of-interest precautions, except that during the first stages of selecting some arbitrators, the parties can object to people on the list.

This precaution is abandoned by the association quite quickly, however, and in Perl-Mack's case, after NCR had objected to the first list, Perl-Mack had only one single opportunity to object — which it did. It rejected the second list, asking for legal knowledge.

After this, under the association's rules, the arbitrator could be chosen without being reviewed by the parties.

In partial defense of the arbitration association regulations, the problems of the NCR user could be unique. The computer-and-business qualification is remarkably restrictive. But if arbitrators with apparent conflicts of interest can be appointed even once by the association, that is once too much.

In my Aug. 25 column, I did not suggest in any way that the association had blindly chosen Mahan without its own review, as he seemed to suggest in his letter. But when the group's decision was made, his name was communicated without prior warning — that is, "out of the blue" — to the user.

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Software Production Remains Large Problem

(Continued from Page 41)

contracting for software is to require a "break-in" phase by the contractor in which he is asked to review and feed back his full understanding of the requirements and the development objectives as a prerequisite to the start of the actual implementation.

This activity is best carried out within the disciplines of structured analysis. It doesn't really matter which methodology is used, as long as one performs the process under a well-defined discipline.

This procedural step — while possibly retracing earlier in-house activities which may have established the user requirements in the first place — will:

- Reconfirm and authenticate the operational requirements.

- Provide expected performance parameters.
- Establish test and acceptance procedures.

- Validate the vendor's understanding and commitment.

After this step is satisfactorily completed, schedules and prices can be established and the customer can then organize to monitor and manage the software development.

In fact, the serious buyer may well wish to purchase this initial phase of the project from two qualified sources in order to provide a check and balance. It has been clearly established that most of the serious defects in software occurring during the operation of a system can be traced back to initial design flaws and oversights. Hence,

extra dollars spent early in the game are the best investment that can be made to minimize postcontract problems. And yet, it is this step which is too often expected as a "freebie" in the government procurement process.

Even More . . .

But that isn't all that matters. The report overlooked two other important points.

The first is concerned with the apparent belief that "correct" specifications at the outset, and maintaining adherence to those requirements, eliminate problems in developing software.

Unfortunately there are not many systems that can be prescribed at the outset and for which changes do not abound as development progresses.

But even more important, the client or end user often does not really know what is being sought in detail until pieces of the development become visible.

This understanding of the software construction process suggests the early need for completion of basic functions of a system in order to provide a means for the user to track both progress and direction. This step becomes, therefore, an important and measurable contractual milestone.

Finally, we caution the software buyer about another overlooked aspect. This is the postcontract, operational phase during which the maintenance activity begins. The referenced GAO report emphasized the construction and delivery phase of government contracting for software, but ignored the operational impact of the delivered software.

In other words, the problems with custom-developed software in the federal government may have been found to be even worse than reported if the maintenance experience had also been studied and evaluated.

A Compromise That Backfires

(Continued from Page 41)

sure. Alchemy expressed pleasure. And Minimax, of course, was elated.

It was three days before his first trip to London that it happened. "By the way, Ted," his boss said in a soft voice, "the top brass in contracts need to check over your figures on the Minimax contract."

"Sure, no problem," Ted mouthed, his world collapsing inside him. "I'll get the folder for you now."

It had been such a small compromise.

Productivity: Truth Repeated

(Continued from Page 41)

the physical environment for programming:

"I agree with you that programmers need peace and quiet to do their thing, and crowding them together in a big room to save floor space costs far more in the long run in lost efficiency, delays and overruns.

"What you discussed is not new. It is as old as the first line of software ever written, but the truth bears repeating from time to time for emphasis. If your article convinces only one group to think things over and make some improvements, then it is worthwhile. Perhaps you should reprint your article every six months or so."

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Updates Query Facilities

Cincom Makes Enhancements to 'TIS'

CINCINNATI — The addition of batch query, generic queries and query update utilities mark the major enhancements to Cincom Systems, Inc.'s latest release, 1.2, of its Total Information System (TIS).

The batch query utility is identical in functional capabilities to the existing TIS on-line query, except that users will have to describe all desired information prior to execution, according to Alex Kuli, marketing manager.

Batch query gives users the option of requesting information and executing either on-line or in batch mode; users of on-line facilities also gain the capability of sorting data by running it in batch, Kuli said. This utility was reportedly designed for situations where large volumes of data are expected in response to a query.

Generic Queries

A generic queries utility, which defines a general type of information request, is said to make stored queries more flexible. With this facility, a question is formulated, validated and stored, but specific data values are not required until the time the GO command is given.

Another enhancement, query update, ensures that previously saved queries still receive valid responses if changes are made to data relationships or descriptions in the TIS Directory, Kuli claimed.

If the stored query is no longer correct, this utility will inform users of which statements need to be changed, he explained.

Other enhancements to TIS Query include a naming conventions facility that lets users save expressions or queries only if the name obeys reasonable syntax rules, and translate tables that now allow users to ask questions using the full English word or the internal code, since it will translate the word into the code it recognizes and then give the answer in the English word.

TIS Query has also been expanded to allow alternate methods of displaying large amounts of data; instead of a partial display of information, the system will now automatically adjust the format to maximize the amount of data that can be displayed, Kuli stated.

In addition, with a resource consumption limits utility, the data administrator can set limits — for example on the number of base file reads in on-line mode and number of output print lines

in batch mode — to regulate how much of system resources end-users may consume.

Directory Maintenance

TIS Release 1.2 also includes improvements to the on-line directory maintenance utility, reducing the number of steps and keystrokes required for its use and allowing users to automatically produce updates contained in TIS Product Assistance Newsletters and machine-readable patches directly from Cincom's Assistance Request data base.

The TIS Directory is sold with

the TIS Data Base Manager for a one-time license fee of \$99,750 or \$1,995/mo on a one-year lease. The on-line directory maintenance utility must be licensed separately for \$16,250 or \$325/mo for one year.

License fees for Batch Query are \$20,000 or \$400/mo on a one-year lease; On-Line Query licenses for \$50,750 or, on a one-year lease term, \$1,015/mo.

Three- and five-year lease licenses are also available from Cincom Systems, Inc., 2300 Montana Ave., Cincinnati, Ohio 45211.

Top-Down Design

Structured Path Eased on VAX-11

SEABROOK, Md. — An interactive software system that is said to provide users of Digital Equipment Corp. VAX-11/780 processors with simplified access to application systems has been developed by Business and Technological Systems, Inc. (BTS).

Aimed at systems analysts, programmers and end users in commercial environments, the user-transparent Video system provides the framework for top-down structured design of application systems, BTS said.

Besides helping implement new application systems, Video can be used to organize existing programs into structured, easy-to-use application systems, a spokesman added.

Tree Structure

With Video, an application system is viewed logically as a hierarchical or tree structure wherein the nodes are either menus (which are logical decision points), instructions, programs or DEC Control Language (DCL) command procedures, the spokesman explained.

As a user traverses a path through a tree, menus and in-

structions are displayed and programs and DCL command procedures — which appear as leaf nodes in the tree structure — are executed.

To control the path, a user re-

sponds to each menu display by entering a number corresponding to one of the options specified in the menu. The need for user expertise in the VAX computer system (Continued on Page 48)

'Omega I' Lets OS Users Create, Convert, Update Files

MANHATTAN BEACH, Calif.

— A file maintenance system that reportedly gives IBM users running under OS (TSO or batch) the ability to create, update or convert data files without programming has been unveiled by DeFaro Software Systems Co.

Users of Omega I, which consists of three functions, reportedly can be trained in three hours.

The CREATE function is said to give the user the ability to create physical sequential (PS) or Isam data sets with fixed or variable length records on disk or tape media.

The package's UPDATE function gives the user the ability to select and display records from a PS or Isam data set containing

fixed or variable-length records.

CONVERT will give the user the ability to perform a variety of conversion jobs without conventional programming, according to the vendor.

Omega I will not access protected data sets unless proper passwords are provided by the user, the vendor claimed.

In addition, Omega I does not require pre-expansion of macro-generated code, the vendor said. It will run immediately once the user specifications are read and determined to be correct.

One-time license fee for the package is "approximately \$15,000," a company spokesman said. DeFaro's address is P.O. Box 3216, Manhattan Beach, Calif. 90266.

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'ASM' Enhancements Boost Vsam Support

LOS ALTOS, Calif. — The Cambridge Systems Group is offering an enhanced version of its Automated Space Management (ASM) system that reportedly features increased Vsam support, extended preprocessing and completely rewritten documentation.

Release 2.5 of ASM2 retains the original design concept of allowing usage characteristics of data to determine the placement and type of storage medium to be utilized. It contains several improvements that increase ASM2's flexibility and usability, the vendor claimed.

Improved Vsam support includes

maintenance of a last-use date, use count information and an SU60-like change flag for Vsam clusters; extended Vsam billing and reporting; and system-initiated archival and incremental backup of Vsam data sets concurrently with non-Vsam data sets, a spokesman said.

Incremental backup and recovery are more automatic and interfaces to TMF and TLMS are improved, the vendor claimed. Integrated support of ACF2 and RACF is included.

ASM2 costs \$14,250, the vendor said from 24275 Elise, Los Altos, Calif. 94022.

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OSI Offering 'OSI/Airs' Via Remote Services Net

SANTA CLARA, Calif. — Optimum Systems, Inc. (OSI) is now offering OSI/Airs via its remote computer service network.

The introduction of the product coincides with OSI's entry into the interactive marketplace with VM/CMS. When coupled with the previously offered remote batch capability of MVS and Superwylbur, VM/CMS gives the OSI/Airs service a complete line of remote computing capabilities, the vendor claimed.

With VM/CMS, OSI also announced

the availability of System 2000/80 as an interactive program product.

System 2000/80 is a user-oriented data base management system (DBMS) from Intel Corp. It allows the interactive user to create and manipulate his data base to generate reports in less time than the traditional batch-oriented DBMS, according to a spokesman.

OSI/Airs is priced according to amount of computer time used, the vendor said from 2801 Northwestern Parkway, Santa Clara, Calif. 95051.

Interactive APT Package Targets Novice Programmer

DALLAS — University Computing Co. (UCC) is offering an Interactive APT processing Package designed for the novice programmer or programmers who infrequently use a computing service.

The package was developed by Robert Drewry, president of Digital Manufacturing Systems of Wichita, Kan. UCC recently acquired the rights to the package.

Features include complete interactive

processing, on-line editing and plotting capabilities. The package is upwardly compatible with UCC-APT and offers standard Ansi plus on-line error correction and graphics display of both geometry and tool motion.

The Interactive APT package runs on a Digital Equipment Corp. PDP-11/03 minicomputer. The package, with PDP-11/03, costs about \$35,000, the vendor said from UCC Tower, Exchange Park, Dallas, Texas 75235.

'Hipo-11' Gives Diagrams

SCHAUMBURG, Ill. — Reicor Systems, Inc. has introduced a Hierarchical Input Process Output (Hipo)-11 package that automatically generates Hipo documentation diagrams for programs written in Basic-Plus on Digital Equipment Corp. PDP-11 minicomputers.

By using Hipo-11, PDP-11 users are able to produce consistent and accurate documentation automatically, the vendor claimed. Hipo-11 is reportedly capable of diagramming up to 255 levels with up to 255 routes per level.

The package costs \$1,500 from the vendor at Suite L, 1305 Remington Road, Schaumburg, Ill. 60195.

Structured Path Eased on VAX

(Continued from Page 47)
tem and its command "is all but eliminated," the vendor claimed.

The application programs that reside at the leaf nodes of a tree structure can share information easily and efficiently by using the Video Communication Facility (VCF), BTS said.

VCF permits any number of 512-byte pages to be defined as an application program communication area when the tree structure for a new application system is initialized.

Each Video interface tree can have a communication area associated with it for its application programs to use while running under Video, the spokesman said. The communication area for an application system is established whenever a Video session is initiated and is deleted upon completion of the session.

Video also provides for system security, in that any node within the tree structure, as well as the tree maintenance function, can be password protected, the firm claimed.

Video costs \$6,000 for perpetual license, \$560/mo (for 12 months) for a deferred payment perpetual license, \$275/mo rental fee for a minimum of six months and \$600/year for maintenance. Maintenance includes enhancements not provided as chargeable options and documentation updates.

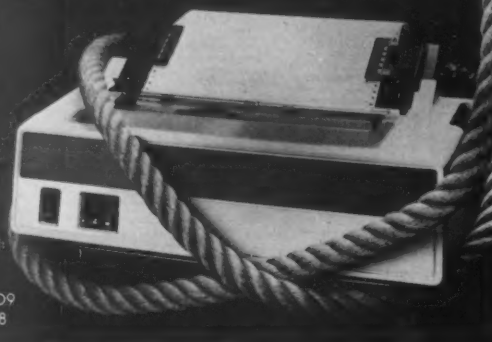
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HP 1000s Get Source Management

ABERDEEN, N.J. — A source management package for the Hewlett-Packard Co. 1000 has been developed by Corporate Computer Systems, Inc. (CCS).

The package is comprised of the Scons/1000 source control system and the Delta/1000 optional file difference

calculator. Scons/1000 contains the tools to manage large-scale software development projects, providing control over source module creation and change, CCS said.

Running in the RTE IVB operating system, Scons will support multiple users, multiple source control systems

and multiple projects within a source control system.

The companion Delta/1000 program, although not required for Scons, is said to be useful for detecting differences between two disk files. It will calculate the minimum difference and produce a file of edit commands to bring the two files into alignment. Included with Delta is the edit program Undelta.

A license for the Scons/1000 costs \$5,000 for the first copy and \$2,500 for each additional copy. Delta/1000 is included with Scons, but may be purchased separately for \$995 per copy.

CCS offers software update services and a phone-in consultant for Scons and Delta. The firm is located at 675 Line Road, Aberdeen, N.J. 07747.

DG Minis Get Retail Tool

PHOENIX — Data Financial Systems, Inc. has unveiled its Adapt software package for use on all Data General Corp. minicomputers.

The package includes modules for general ledger, accounts receivable, accounts payable and payroll applications.

These foundation packages are functional in standard form or can be custom-tailored by nontechnical personnel using Adapt, the vendor claimed.

The price for the product is \$4,800, the vendor said from 4350 E. Camelback Road, Phoenix, Ariz. 85018.

Operations Management Aid Geared to MVS Shops

NEWPORT BEACH, Calif. — Software designed to aid operations management has been introduced by Tiger Systems for IBM MVS shops.

OP-MGR reportedly gathers data on tape mounts, disk mounts, unit record intervention, printer delays and paper changes, and produces exception reports of unusual delays by shift.

OP-MGR will print shift activity summaries on a daily, weekly and monthly basis of average mount times, best response, worst response, memory waste and percent within target range. Free sample graphs and reports

are available.

OP-MGR costs from \$250/mo rental. Tiger Systems is located at Koll Center, Suite 3000, 4000 MacArthur Blvd., Newport Beach, Calif. 92660.

'Pills' Assists Pharmacists

LUFKIN, Texas — A software package designed to help pharmacists fill prescriptions and provide access to refill and patient history data is available from ERG Software, Inc.

Known as the Prescription Information Logging and Labeling System (Pills), the package allows prescriptions to be keyed in as the pharmacist fills them and identified as Medicaid, third-party or regular billing, the vendor claimed.

All prescriptions are assigned a unique number which will be printed on the medication label and used to recall prescriptions for refill, a spokesman said.

The package was designed to run on the IBM 5110/5120 and costs less than \$18,000 for both hardware and software, the vendor said from 101 Industrial Place, Lufkin, Texas 75901.



Bobby Harper, Manager of Information Services, Vought Corporation

Vought Corporation makes planning fly with IFPS.

Vought Corporation, aerospace subsidiary of The LTV Corporation, is a half-billion dollar company which builds military aircraft, missiles and space systems and commercial aircraft components.

Bobby Harper, Vought's Manager of Information Services, recently discussed their use of EXECUCOM's Interactive Financial Planning System (IFPS).

"IFPS was chosen by Vought Corporation in 1976 as our first venture into the area of Decision Support Systems. Comparative studies of products existing at that time proved IFPS to be the only one with a current set of superior capabilities plus unlimited expansion possibilities," he said.

"IFPS has proven itself in direct support of management by providing timely response to management questions that otherwise would have remained unanswered in the time frame allowed. Applications have been most prominent in the financial areas. However, many significant uses are found in manufacturing, materials, and engineering," he noted.

Uses at Vought include debt planning, debt management, treasury operations, consolidation of balance sheet and income statements, transportation, facilities, and engineering planning and forecasting.

He continued, "Answers to critical questions that once were not available may now be researched in a reasonable

time. Analysis of data that required production programs and unacceptable lead time to compose routines may now be obtained in time for decision-making department heads to use it."

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Ups Response, Throughput 'OS/32 Link' Fits 32-Bit CPUs

OCEANPORT, N.J. — A linkage editor for Perkin-Elmer Corp. (PE) 32-bit computers, including models 3220 and 3240, has been introduced by that company's Computer Systems Division.

OS/32 Link is an integral component of the 32-bit operating system OS/32.

Compared to its TET/32 predecessor, OS/32 Link provides major improvements in response and throughput and also fully exploits the memory

architecture of the PE 3200 computer systems, permitting programs of up to 16M bytes to be created in up to 256 individually protected, relocatable segments, a spokesman said.

The product is downward compatible to the company's models 7/32 and 8/32.

Economies in the use of system resources can be achieved with the tree-structured automatic overlay scheme of the OS/32 Link, the vendor claimed, adding it manages the

loading of overlays at run time without placing constraints on the programmers.

Optimization of resources can be achieved through experimentation with the structure, by working with the linkage editor, and with no reprogramming, the spokesman said.

OS/32 is priced at \$6,000 for 9-track magnetic tape and \$6,700 for 10M-byte disk, the vendor said from 2 Crescent Place, Oceanport, N.J. 07757.

'Explain' Aids Documentation

MINNEAPOLIS — A Documentation Development Methodology (DDM) package that provides users with the tools needed to develop their own documentation has been announced by Writing Laboratories Group.

Explain — an "organized and disciplined approach" to writing for an organization or business — comprises two

writing cycles, according to the vendor.

The Development Cycle describes, in general terms, the procedures to be followed to produce new documentation. The Updating Cycle describes steps toward updating existing documentation.

The major sections of Explain include a resource planning guide, a control guide, a

writing and editing guide, a documentation content guide, a production guide and a guide to specialized terms.

Besides the guides and their accessories, Writing Laboratories Group personnel provide a series of orientation classes.

The Explain package costs \$15,000 from the firm at Suite 810, 730 Hennepin Ave., Minneapolis, Minn. 55403.

Protocol Eases Data Base Tasks

NASHUA, N.H. — Functional Automation/Gould, Inc. has unveiled a "software protocol" that permits data base entry, storage, manipulation and retrieval. Functional Automation File Zero resides in all F64 Cyblock computing

and I/O processing modules and allows preparation and use of software programs regardless of the type or mix of memory storage media, the vendor claimed.

With an identical message interface for all media, languages and users, it simplifies access to and expansion of the data base stored throughout a loosely coupled Cyblock network, a spokesman said.

Facilitating system expansion with no program

changes, the product provides an inherent memory sharing and write-protect mechanism. Memory portions are assigned to individual owner Cyblocks, and only owners have write-access and ownership transfer privileges.

The product is a free and fully supported feature of F64 Cyblock building block computing and I/O processing modules, the vendor said from 3 Graham Drive, Nashua, N.H. 03060.

Cross-Assemblers For Micros Run On DEC PDP-11

BEDFORD, Mass. — A line of microprocessor cross-assemblers which run on the Digital Equipment Corp. PDP-11 series under Western Electric Co.'s Unix operating system is now available from System Kontakt, Inc.

The line includes cross-assemblers for the 8048, 8086, 8085, Z80, Z8000, M6800, M6809, MC68000, 6502 and 9900 microprocessors.

The products are available in either relocatable or absolute version. They are written in Macro-11 assembly language and sources are available from System-Kontakt under single-unit licenses. Unix versions of the Macro-11 assembler are also offered.

Prices range from \$2,000 for the 8085 cross-assembler to \$3,500 for the 8086 version, the vendor said from 6 Preston Court, Bedford, Mass. 01730.

Z8000 Cross-Software Tool Gives PDP-11s Source Code

CUPERTINO, Calif. — Zilog Inc.'s cross-software package that allows Digital Equipment Corp. PDP-11 users to develop code for Zilog's 16-bit Z8000 microprocessor is now available with source code. Previously the package was only available with object code.

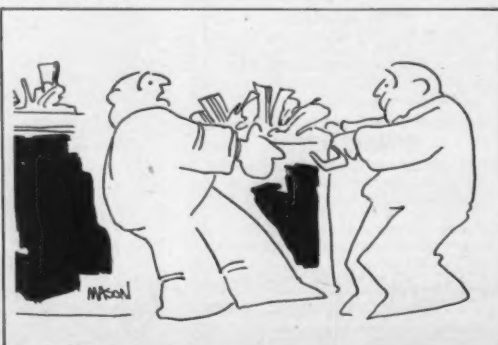
The package runs on West-

ern Electric Co.'s seventh edition of the Unix time-sharing system and costs \$10,000 for the first CPU and \$3,000 for each additional CPU.

The Unix software runs on PDP-11/44, PDP-11/45 and PDP-11/70 systems, the vendor said from 10340 Bubb Road, Cupertino, Calif. 95014.

Correction

Softool Corp.'s Software 80 is also available off-the-shelf for Systems Engineering Laboratories, Inc. users [CW, Sept. 15].



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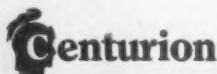
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'SDSI' Lets VS1 Users Prevent Concurrent Updates

SACRAMENTO, Calif. — Software Module Marketing, Inc. (SMM) is now offering its Shared Data Set Integrity (SDSI) system to multiple CPU users in a VS1 environment.

SDSI prevents concurrent updates on those data sets which are shared between multiple CPUs, the vendor claimed, adding it can intercept any ENQ or RESERVE request and convert it into a global ENQ. This allows

an installation to have a global data set integrity protection and eliminate hardware device reserves, a spokesman said.

The price for the product is \$12,000 on two CPUs and \$15,000 for more than two CPUs. The price includes maintenance and support for the first year, the vendor said from Crocker Bank Building/Penthouse, 1007 Seventh St., Sacramento, Calif. 95814.

'Flexifile 21' for DDP Use Gives Prompted Data Entry

MOUNTAIN VIEW, Calif. — Tri-Data Corp. has released an enhancement to its Flexifile 21 intelligent floppy disk subsystem that reportedly allows it to handle prompted data entry in distributed data processing (DDP) environments.

The prompted data entry program gives the user the tools to format input

data on an interactive, step-by-step basis. The vendor claims the package can be used by inexperienced users and programming is faster.

The package costs \$200 on diskette and is available through all Tri-Data distributors, the firm said from 905 E. Middlefield Road, Mountain View, Calif. 94043.

For Users Spending \$20,000/Mo

TSR System Freezes Costs

GREAT NECK, N.Y. — In an effort to secure a portion of the corporate time-sharing market, Time Sharing Resources, Inc. (TSR) has announced Fixed Price Time-sharing, which it says could cut the bill of a \$150,000/mo user to \$25,000/mo.

By freezing costs for three years, the company said it can provide an inflation-beating package provided the

user spends a minimum of \$20,000/mo on time-sharing facilities, a TSR spokesman said.

The service is IBM software-compatible and the company says it gives technical service and support. TSR uses two Perkin-Elmer Corp. V32 systems and plans on expanding a spokesman said from 777 Northern Blvd., Great Neck, N.Y. 11021.

System/34s Get Inquiry Package

RESEARCH TRIANGLE PARK, N.C. — An inquiry package for IBM System/34 users who have selected the general ledger module of IBM's Mapics and DFAS applications software is being offered by RLB Systems, Inc.

The package will display closed or open account balances, current balances vs. history or budget and all open detail entries in an edited, easy-to-use format for one or all unclosed

months. The module will preclude running various and sometimes large reports now required to generate the same information, and allows reconciliation of accounts during the month, the firm said.

The module can be customer installed in approximately 20 min and costs \$375. The vendor can be reached through P.O. Box 12764, Research Triangle Park, N.C. 27709.

Real Estate Package for IBM 5100

TRAVERSE CITY, Mich. — Stafford Management Systems, Inc. is offering accounting and property management packages for real estate firms using IBM's 5100 series small business systems.

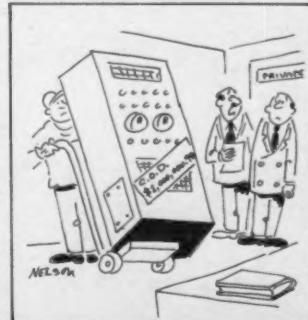
Real-Pro is a real estate brokerage accounting, marketing and management package that offers payroll, accounts receivable and general ledger with budgeting and ratio analysis. Agents can process real estate sales, print seller and purchaser statements and closing reconciliation letters and checks. The package costs between \$4,750 and \$9,700 depending on features chosen, the vendor said.

Stafford is also offering Property-Pro, a property management package that reportedly allows property managers to track up to 1,800 units on a single diskette and generates monthly rent, maintenance and other statements.

It also monitors cash receipts and

generates seven-day notices, the vendor said.

Property-Pro costs \$6,350 from the vendor at 3298 Wysong Road, Traverse City, Mich. 49684.



'— Now if We Can Find a Good Programmer for Under Three Dollars an Hour —'

Pacific Tel Charges May Make Waves

By Phil Hirsch

CW Washington Bureau

SAN FRANCISCO — An attempt by Pacific Telephone and Telegraph Co., AT&T's California affiliate, to impose access charges on its private-line customers has started what looks like a major battle.

Interstate private-line customers whose circuits terminate within Pacific Tel territory would initially pay approximately \$11.75 more per month for each termination. Ultimately, the charge would go as high as \$33.90 per month.

If Pacific Tel is allowed to impose these

surcharges, California's other telephone carriers — the major ones are General Telephone Co. and Continental Telephone Co. — will be permitted to do likewise.

National Campaign

According to those fighting the access charge proposal — which includes the airlines and other user groups, as well as most of the specialized carriers — Pacific Tel's move is part of a nationwide campaign by telephone carriers. The opponents cited a similar move in New York [CW, Aug. 11] and rumors that the Mis-

souri regulatory commission is considering a surcharge on private-line services.

Pacific Tel's proposal was inspired by a 1979 ruling of the California Public Utilities (CPUC) ordering the state's telephone companies to restructure their private-line rates. Among other changes, the companies were told to develop a separate charge for the local exchange costs related to these services. Interstate private-line services became involved at this point because they also use local exchange facilities in most cases.

(Continued on Page 56)

HP Plugs Hole in 2620 Terminal Line . . .

PALO ALTO, Calif. — Hewlett-Packard Co. has plugged a hole in its 2620 CRT terminal family with an additional model that reportedly improves data integrity, cuts system overhead and boosts system throughput during data entry.

The Model 2624A, which bridges the gap between HP's character-mode Model 2621A terminal and its multiscreen Model 2626A, reportedly comes with editing, formatting and data verification features not found in either of the other two products. Each of the features is geared principally to enhancing data entry productivity, a company spokeswoman said.

The 2624A comes in two versions: one with an integrated 120 char./sec thermal printer and the other without such a printer.

Data Verification

As an aid to data verification, the latest addition to the 2620 line provides local data-checking features like protected, unprotected and transmit-only fields. Together, the features ease a host mainframe's processing burden by allowing users to detect input errors off-line, the spokeswoman said.

To further safeguard data integrity, the 2624A performs both field and edit checks of all characters whether alphabetic, numeric, integer, signed decimal or implied decimal. Edit checks reportedly allow the terminal to spot data entry errors and then alert an operator of their existence.

The 2624A also aids data verification by providing required fields and total-fill fields, which in effect guard against incomplete entries or total omissions of crucial input like sales order numbers, the spokeswoman explained.

In addition, the terminal performs various preprocessing steps like justification of lines, numeric fills and implied decimal edits without interacting with its

(Continued on Page 56)

. . . And Upgrades 2645A CRT Unit

PALO ALTO, Calif. — Enhanced editing capabilities, simplified forms design and a dedicated file system reportedly highlight the latest addition to Hewlett-Packard Co.'s 2640 family of CRT display stations.

The Model 2642A, although compatible with HP's previously announced Model 2645A, sports several performance features not available with the older terminal.

One of the 2642A's purported enhancements is increased mass storage capacity. Unlike the 2645A, whose integrated mass storage was limited to 220,000 bytes, the latest member of the 2640 series accommodates a total of 540K bytes. Moreover, the 2642A uses two nonintegrated 5.25-in. floppy diskettes as its storage medium, whereas the older 2645A uses dual mini-cartridges.

Compared with the 2645A, the 2642A reportedly boasts improved text editing features, including the ability to rearrange paragraphs, justify lines, copy paragraphs and perform search-and-replace operations. The 2642A also offers a "word wrap-around" capability that allows the terminal to transfer a word from the end of one line to the

beginning of the next, rather than hyphenating the word at the right margin.

A third performance advantage of the 2642A over the 2645A is a software module that reportedly simplifies forms design. Con-

(Continued on Page 56)

SDLC Capability Added To Raytheon's PTS-2000

NORWOOD, Mass. — Raytheon Data Systems Co. has added IBM Synchronous Data Link Control (SDLC) capabilities to its PTS-2000 information display system, introduced in April as an emulator for small-cluster IBM 3276-type display systems.

The SDLC announcement means the PTS-2000 system can now use IBM's Systems Network Architecture (SNA)-based terminals, the firm said. Also added to the PTS-2000 system's capabilities

were a 3,440-char. screen capacity and support for 9,600 bit/sec data rate communications.

The PTS-2000 consists of an intelligent microprocessor-based controller that supports up to eight devices, either operator display/keyboard terminals or a 120 char./sec printer, Raytheon said.

The addition of the 3,440-char. (43-line by 80-char.) capability

(Continued on Page 56)

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—Larry Petterson, Director of Data Processing, St. Olaf College, Northfield, Minnesota.

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Tool Analyzes 3270-Type Nets

NORWALK, Conn. — A data collection instrument that determines the performance level of data communications networks utilizing IBM 3270 or equivalent and NCR Corp. 501 terminals has debuted from Datacomm Management Sciences, Inc.

The Response Time Analyzer (RTA)-327 can make measurements at the CPU or remote controller site via a bridged (in-service, noninterfering) basis on the RS-232 interface between the communications controller and modem.

The RTA-327 was designed for use with binary synchronous communications protocols.

It costs \$4,875 from the firm at 181 Main St., Norwalk, Conn. 06851.

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Wajozota, Minnesota 55391

Proposed Surcharges May Make Waves

(Continued from Page 53)

As subsequently proposed by Pacific Tel, the access charge would apply to all interstate foreign exchange (FX) services, all telephone company-provided access lines connected to dedicated switching systems — such as CCSA and EPSCS — and to tie lines and others "which terminate at other than a nonkey telephone set at both ends."

The charge would apply not only to circuits supplied directly to the end user by Pacific Tel, but also to those supplied indirectly, via specialized carriers.

It would also apply to wideband and Telpak private lines connected to local exchange networks, as well as to similar, privately owned microwave or satellite network facilities.

The charge, in each case, would be imposed only on those circuit terminations within Pacific Tel territory.

The carrier proposed a monthly ac-

cess charge of \$33.90 per termination for off-net access lines, FX and private arrangements. For all other private lines, the monthly charge would be \$32.50. To assure an orderly transition, the company said the charges would not become effective until 12 months after they were accepted by the California commission, and then only 35% of the full amount would be levied.

However, six months after this Phase I charge went into effect, it would be increased to 70% of the full amount, and six months after that the full rate would be imposed.

According to a spokesman for the CPUC, a final commission decision on Pacific Tel's proposal is likely to be announced next month. If the proposal is accepted, Pacific Tel probably will file a tariff in late October or early November. The commission would act on it "soon afterward," which could mean that the new rates will become effective

before the end of next year.

The spokesman added that if the Federal Communications Commission (FCC) insists on reviewing the access charges before they go into effect, California won't object. But such a review doesn't guarantee rejection.

While the FCC has turned down the surcharge proposed earlier in New York, it did so primarily because that levy was imposed only on interstate private-line users.

In California, by comparison, the charge would apply to both interstate and intrastate users — although the latter group, because of proposed changes in mileage rates for intrastate private-line services, would end up paying less, in most cases, rather than more.

The FCC is now reviewing the access charge issue on a national scale. If a number of states propose increases like the one pending in California, it could have a decisive impact.

HP Plugs Gap in 2620 Terminal Family...

(Continued from Page 53)

host processor. If a flawed data entry is detected by the terminal itself, a message explaining the error is displayed across the bottom two lines of the unit's video screen.

If an error is spotted instead by a host processor, a message again appears on the bottom two lines, and after the mistake has been corrected, a built-in "read/modify" feature can be used to transmit only the modified fields back to the mainframe.

To ease the creation of entry forms, the 2624A provides a standard 64-char. line-drawing set, with math sets and large characters optional.

Among its other features, the terminal offers eight user-definable "soft

keys" that allow data entry clerks to execute several local or remote functions with the push of a single button. Each soft key can be labeled on the unit's display screen with up to two 8-char. lines.

Though intended primarily for data entry and data retrieval, the 2624A can also be used by programmers for software development, the spokeswoman said. A standard version of the terminal comes with four pages of display memory, which can be used for scrolling or paging through lines of code, and an additional five pages are available as an option.

The unit permits programmers to enter or edit their code in either character or line mode, the spokeswoman added.

Equipped with a standard RS-232C

or an optional 20 mA current loop interface, the 2624A communicates point-to-point at up to 9,600 bit/sec in either full- or half-duplex asynchronous mode.

The terminal's optional built-in printer operates in various modes, including a compressed print variety in which 132 characters are squeezed into each line of hard-copy text.

Excluding integrated printer, the 2624A costs \$2,750. A printer adds another \$1,150 to the price. Other options include additional display memory, which costs \$200, and European character sets, which sell for \$100 each.

Deliveries of the 2624A take eight to 10 weeks from HP at 1507 Page Mill Road, Palo Alto, Calif. 94304.

...While Adding 540K-Byte Display Unit

(Continued from Page 53)

trolled by screen-labeled function keys, the forms design module allows users to create unprotected or transmit-only fields and specify alphabetic or numeric field checks.

The module also allows users to take advantage of various display enhancements, including features like inverse video, blinking and underscoring.

By virtue of its forms design module and text editing capabilities, the 2624A can perform many keyboard applications like data entry and document preparation locally and then transfer the jobs to a remote host mainframe for processing. With the 2645A, by contrast, most of these same kinds of jobs had to be done on-line, an HP spokesman explained.

To a host processor, output from the 2642A's floppy diskettes looks exactly the same as output from the 2645A's minicartridges, HP said. As a result, users whose programs have previously been stored on cartridge tapes can now transfer them to diskettes without having to make any software changes.

The 2642A, which HP describes as filling the gap between smart and intelligent terminals, incorporates 88 80-char. lines of internal memory, a 24-line by 80-char. video screen and a choice of interfaces, including a standard RS-232C or an optional 20 mA

current loop. The station also comes with an optional "shared peripheral interface" that accommodates up to eight other 2642As or serial printers.

A single-diskette version of the ter-

minal costs \$6,750; a dual-diskette version, \$7,750. Both models require eight to 10 weeks for delivery from HP at 1507 Page Mill Road, Palo Alto, Calif. 94304.

PTS-2000s Gain SDLC

(Continued from Page 53)

brings the number of screen capacities within the PTS-2000 family to four. The other capacities are 960 char. (80 by 12), 1,920 char. (80 by 24) and 2,560 char. (80 by 32).

Any combination of the four screen capacities can be mixed within a single PTS-2000 system, including support of up to eight operator displays and printers, according to the firm.

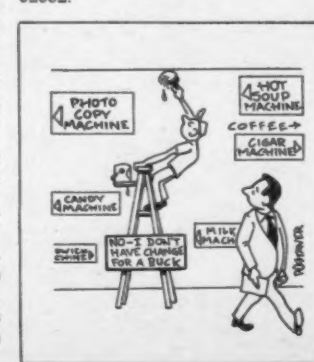
The 9,600-bit/sec data rate support feature is in addition to the existing three speeds of 2,400-, 4,800, and 7,200 bit/sec.

The SDLC capacity is a no-charge option, and delivery will begin in December.

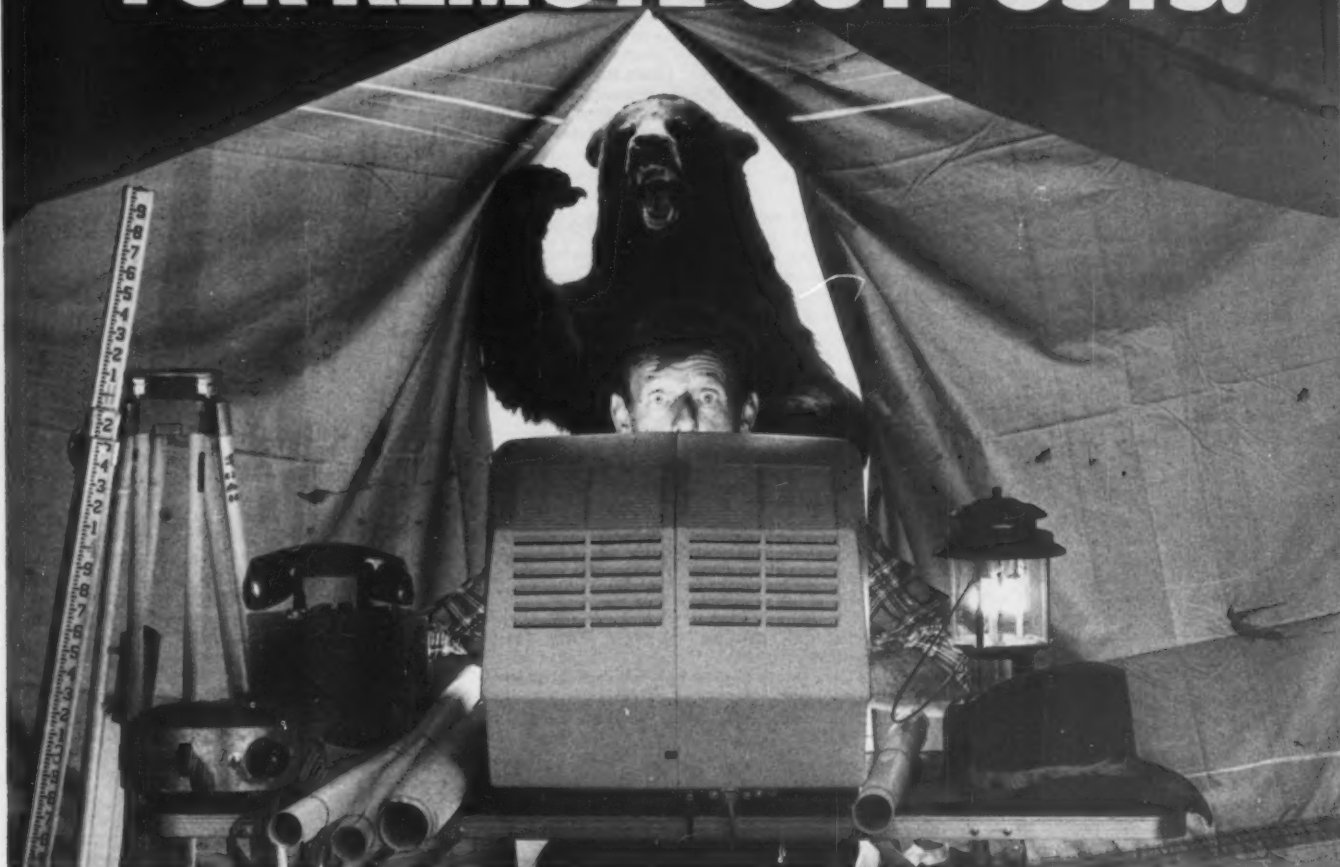
The 9,600 bit/sec data rate capability is also free, but users must install modems that operate at that rate when installing PTS-2000 systems on a 9,600 bit/sec-rated communications line. The 3,440-char. display feature costs \$396 or \$11/mo for each screen in a configuration.

A typical PTS-2000 configuration with four display screens, one controller and one 120-char./sec dot matrix printer costs \$22,170 or \$529/mo on a two-year lease, including maintenance.

Raytheon is located at 1415 Boston-Providence Tnpk., Norwood, Mass. 02062.



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DDP Revolution — Part 2

Future Terminals Must Give User-Transparency

By Chuck Steele
Special to CW

For dispersed processing to become a reality, the information stations that succeed the present multiprotocol terminals must be designed such that the means of communication is completely transparent to the user, automatically analyzes what is coming over the transmission line, automatically catalogs the protocol and automatically switches into that mode.

The information stations that will serve as the nodes in this dispersed processing structure will have the following characteristics:

- Ease of use for programmers and end users.
- Easy user expandability; that is, I/O drivers do not have to be assembled into the system for each additional peripheral.
- Modular with transient functions which are memory-resident only as required.
- System features allowing for easy maintainability and upgradability.
- Transportability to different hardware with relatively little assembly code rewriting.
- Device independence.
- Multiuser, real-time and multiprogramming modes of operation.
- High-level language support.
- Automatic job control capability.
- Editor, copy, dump and debugger.
- Diagnostics.
- Data base management featuring

multiuser access to data sets, index sequential capability with multiple index file capability, volume ID controls, bidirectional relational data sets and variable length records.

This is the last half of a two-part article on the future of dispersed processing.

- Transparent mode for terminal usage with a host system.
- System language that is extendable, structured, compact and efficient.
- Compilers written in OS language.
- Multiprocessor operation.
- Devices equally accessible from all tasks and users.

CPU Characteristics

Many of the limits to the ability of present multiprotocol information terminals can be overcome with the use of a processor of sufficient power.

Specifically, such a processor should have 15 generic operations; one address and three field instruction formats; a single internal data bus comprising separate address and data lines; all registers, data paths and primary store locations 16 bits wide; a primary store read/restore cycle of 1 microsec; and 16 general-purpose registers.

In addition, the CPU should have an average instruction time of 2 microsec;

a primary store organized in blocks of 256 words; addressing modes of indexed, indirect and segmented; a vectored interrupt mechanism; a multiplexer channel; and a direct to primary store selector channel capable of operating in block or word mode.

Present terminal configurations based on 8-bit CPUs such as the Z80, 8085 and 6800 require extensive upgrading to match these specifications. However, recent developments in 16-bit microprocessor design are approaching the basic functional features assumed here.

For example, the Z8000 from Zilog, Inc. along with its support chips incorporates all other necessary features. With the exception of general-purpose registers, the Motorola Corp. 68000 with its support chips also qualifies. Another candidate is the NS16000 family from National Semiconductor Corp.

The next-generation information station will also incorporate data link control protocols into hardware — either into separate microprocessors or into data link control ICs.

As a result, the next-generation successors to today's multiprotocol terminals will see much of the software-supported data link control function taken over by hardware, specifically any one of a number of protocol chips available from a number of semiconductor manufacturers.

Most are programmable and can thus

support more than one data link protocol. Also, some of these chips can support data rates up to 2,000,000 bit/sec and several protocols such as Bisync.

In the dispersed processing environment there is the problem of memory. Because local memory is usually connected to the specific terminal CPU via a dedicated bus link, contention usually occurs in relation to the global memory. It is apparent that as the number of global memory accesses (terminals) increases, contention increases and throughput decreases.

As memory prices drop and new high-density devices, such as 64K- and 256K-bit NMOS dynamic random-access memories and 256K-, 512K-, 1M- and 4M-bit bubble memories come into production, replication of global memory programs can be done throughout local memories, rather than single copies in global memory, thus eliminating a major source of contention.

What this will mean to the user is that, ultimately, mainframe CPUs may soon be completely unnecessary in many applications, being replaced by multiprocessors of various sorts. As technology fuses more systems onto the chip, information stations incorporating the latest in semiconductor technology will cost little more than today's intelligent terminals.

Steele is the vice-president of engineering for ECS Microsystems, Inc., based in San Jose, Calif.

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With Honeywell Level 6 Insurer Cuts Claim Processing Time 80%

MADISON, Wis. — Installing a \$200,000 mainframe enabled Wisconsin Life Insurance Co. to slash its "typical" claim processing time by approximately 80%, according to a company spokesman here.

Most of the time reduction is credited to the group insurance company's recently installed Level 6 Model 43 computer from Honeywell, Inc., he said.

The firm's immediate objective in ordering the Level 6 with .5M bytes of main storage was to off-load the majority of the communications burden then being carried by a 256K-byte 2040A Honeywell mainframe, John Sonderdger, Wisconsin Life Insurance president, noted. He described the 2040A as "a real workhorse," but said the company's growth was forcing the older machine "to perform certain operations that it simply wasn't designed to do."

Broken Pencils

When operating in the 2040A environment, a good claims examiner might need as long as five minutes to enter 10 lines of data, Leonard Lane, DP vice-president, said.

That examiner can now enter those same 10 lines in just 50 seconds, he claimed. Pointing out that it can be "psychologically nerve-wracking" to wait for the CRT terminal to respond to an inquiry, he observed that "a lot less pencils are being broken out of frustration around here since we've installed the Level 6."

Wisconsin Life also looked at equipment from Data General Corp before making its final hardware selection. However, "we were familiar with Honeywell, and we were interested in the TPS-6 transaction processing system which runs on the Level 66," Lane said. TPS-6 runs under Model 4 of the Level 6 operating system and is not compatible with DG hardware.

The hardware now operates in three distinct environments, according to a company spokesman.

- Linked to a 45-terminal network, it expedites a variety of clerical operations including file searches, claims entry and claims validation.

- Tied to six additional CRT terminals, it is used to facilitate new applications development by the 11-person systems and programming staff.

- Connected to four other terminals, it controls a data entry facility that results in reduced overall system maintenance costs.

With the Level 66 installed in January 1980 and the claims application system brought up during the first week in March, the insurance firm is currently producing approximately 600 claims checks each day, according to Lane.

The terminals are used to verify criteria indicating that both the claimant and the illness are insured, that the policy is a valid one and that the claim has not been paid before.

Approximately 30 unique formats or routines are handled via these terminals.

Turnaround Goal

After an examiner has determined that the claim is a valid one, the amount of the claim, the insured's name and that of the payee are entered. A check is printed that night and mailed out the next day, according to Lane.

"We're finding that 24-hour turnaround is possible in those cases where the identity,

address and policy number of the claimant are known and the claim is recognized as valid. "Providing such rapid service to our policyholders would be ideal, but, realistically, we'd like to get our average turnaround time down to 72 hours," a goal he described as clearly within reach with the Level 66.

Wisconsin Life's programmers are developing applications on the Honeywell system by utilizing the vendor's Screenwrite software through the CRT terminals and by writing Cobol programs, Lane added.

Work is currently being done on a program that will enable the firm to process all new business in on-line mode. Approximately 1,000 new business applications are processed on a monthly basis, he said.

The firm is satisfied with Honeywell's maintenance and service; future plans include installing a DPS/8 system from the same vendor to replace the 2040A, he said.

Bits & Pieces

Calcomp Controller Interface Gives Remote Plotting

ANAHEIM, Calif. — A bisynchronous interface for California Computer Products, Inc. models 907, 918 and 922 controllers is said to provide remote plotting for most Calcomp plotters.

The interface — which uses bisynchronous protocol — emulates the IBM 3780. The unit offers such 3780 features as Ebcid code, multipoint, circuit assurance, auto answer and modem simulator direct connection, Calcomp said.

Serial data in the bisync mode is input at rates up to 19.2K bit/sec, and the unit can be operated in either point-to-point or multipoint configurations.

The interface costs \$3,300 for the 907 controller and \$4,300 for the 918 and 922 controllers. The 907 costs \$4,620, and the 918 and 922 each cost \$18,420. Calcomp is located at 2411 W. LaPalma Ave., Anaheim, Calif. 92801.

Program Diskettes Enhance 3M's Micrapoint System

ST. PAUL, Minn. — Two program diskettes containing a check-digit program and an IBM converter program have been devel-

oped to enhance the performance of 3M Co.'s Micrapoint System, which files and retrieves microfilm.

The check-digit program mathematically verifies the accuracy of numbers input to the Micrapoint unit. The diskette will be created according to the specific mathematical formula required by the user.

The second diskette contains a program which converts Ascii-coded Micrapoint diskettes to Ebcid-coded diskettes suitable for use in IBM 3740, 3741 and 3742 data entry systems.

The check-digit program costs \$700 and the IBM converter program costs \$500 from 3M at P.O. Box 33600, Department Mi80-34, St. Paul, Minn. 55133.

Bidirectional Print Station Performs Financial Tasks

ALLSTON, Mass. — A 40-column bidirectional financial transaction print station that runs at 3 line/sec has been introduced by Capitol Circuits Corp.'s Printer Products Division.

The Model 400T provides a receipt and stored journal; a single-line validation slot is available for check validations.

The unit costs \$735 to \$750 from the firm at 24 Denby Road, Allston, Mass. 02134.

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COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Laser-Scanning Terminal Handles Periodical Returns

HAUPPAUGE, N.Y. — A desktop laser-scanning terminal engineered to process magazine, paperback and newspaper returns and that can interface with most computers via an RS-232C port has been introduced by Symbol Technologies, Inc.

Laserscan 550 optically decodes Universal Product Code (UPC) and European Article Numbering (EAN) symbols with issue codes that appear on periodical covers, providing an alternative to manual data entry methods. Presorting of returns by manual key-stroke entry is also eliminated by using the device, a spokesman said.

The device employs a scan-above configuration that allows the operator

to properly align the UPC or EAN symbol printed on a return. The scanner head provides visual indication via three LED indicators, as well as an audible signal. Additional features are a remote 16-key numeric keypad, 16-digit data display and a 21-column alphanumeric printer.

The Laserscan 550 costs \$9,500. Another version of the device is also available which does not include the remote keypad, data display or printer. This model, the Laserscan 500, sells for \$8,500.

Further information on both products can be obtained from the company at 90 Plany Ave., Hauppauge, N.Y. 11787.

Free Brochures

- A brochure has been produced for utilities that must comply with government regulations to offer residential energy audits. It describes the services of the Enercom System — consisting of customized computer software, processing and trained technicians — and can be obtained from General Electric Information Services Co., Department MCL, 401 N. Washington St., Rockville, Md. 20850.

- A revised version of "Static Electricity," a pamphlet explaining how to identify static problems and what to do about them can be obtained from Static, Inc., P.O. Box 414, Lee, Mass. 02138.

- "Everything You Always Wanted to Know About Computers But Were Afraid to Ask" summarizes and de-

fines the most often used computer terms. It is available from Computer Furniture Systems, 266 Summer St., Boston, Mass. 02210.

- A low-cost security system with control capabilities and a capacity for 999 cards is described in the Programmable Voicing Reader booklet, available from Cardkey Systems News Bureau, 20660 Bahama St., Chatsworth, Calif. 91311.

- "Turning Installation Problems into Profit Using the Computer Power System" is a pamphlet that can be obtained from the Computer Power Systems Corp., P.O. Box 6240, Carson, Calif. 90749.

- A noise-control product catalog of sound-absorption, damping and barrier materials for use with office and DP equipment can be ordered from the Soundcoat Co., 175 Pearl St., Brooklyn, N.Y. 11201.

- The IPS 5000 series microprocessor-controlled dot matrix printers are described in a brochure available from Dataroyal, Inc., 235 Main Dunstable Road, Nashua, N.H. 03061.

- A brochure that outlines the advantages of half-inch streaming tape as a data storage medium is available from Cipher Data Products, Marketing Department, 10225 Willow Creek Road, San Diego, Calif. 92131.

- A catalog of specs, charts and ordering information on the Analog Data Acquisition Systems complete line can be obtained from Phoenix Data, Inc., 3384 W. Osborn Road, Phoenix, Ariz. 85087.

- A brochure on the 3000 Series, T-Bar, Inc.'s adaptable matrix switching systems, can be ordered from the vendor at 141 Danbury Road, Wilton, Conn. 06897.

- Rental equipment, including DP peripherals, communications systems and general-purpose test instruments, is described in a 170-page handbook from Leasametric, Inc., 1164 Triton Drive, Foster City, Calif. 94404.

Spur Controllers Get Fast-Skip Capability

LOS ANGELES — Spur Products Corp. has modified its printer controller for the IBM 1403 to speed line skipping, reducing the time necessary to print most forms, the firm said.

The feature will be included at no extra charge in all new models of the Spur 1403 controller, which Spur said is the only product that permits 1403 series printers to be driven by non-IBM computers or by the IBM Series/1 minicomputer.

The 1403 controller costs \$20,000. Controllers currently in use can be field-retrofitted for \$1,000 a unit.

Spur is located at 1904 Centinela Ave., Los Angeles, Calif. 90025.

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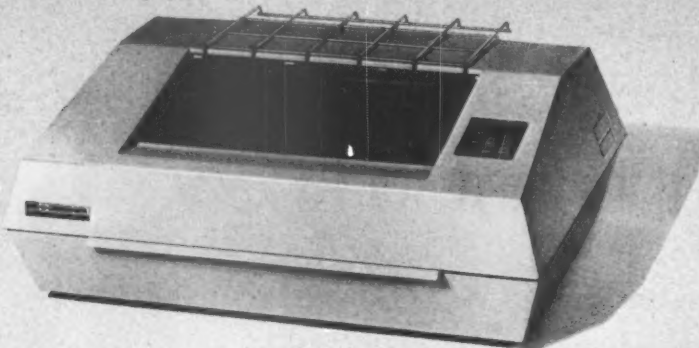
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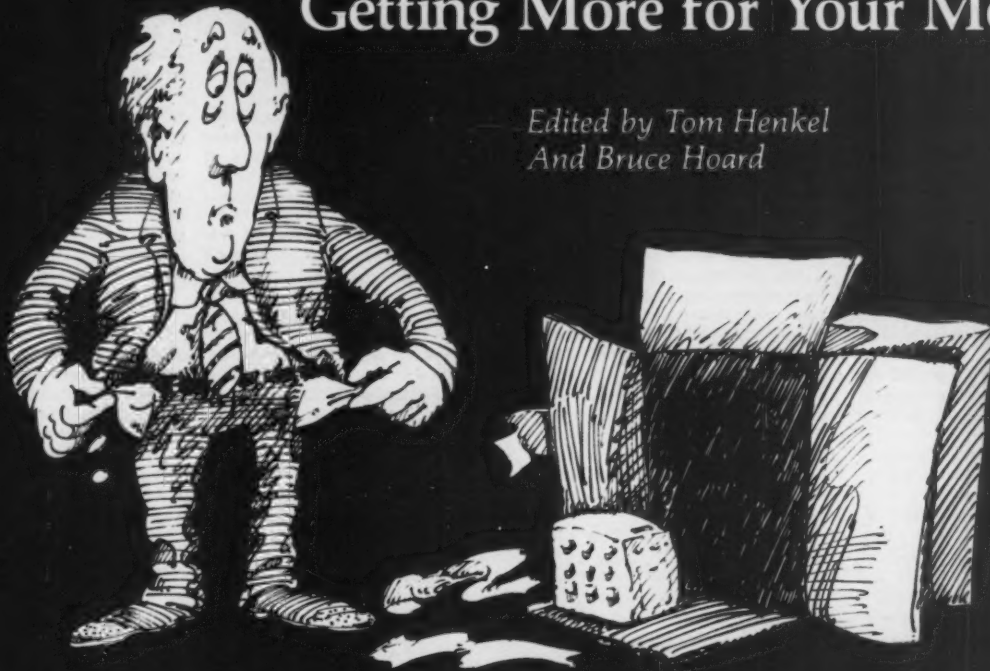
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Sept. 29, 1980

**SPECIAL
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REPORT**

The Dwindling DP Dollar: Getting More for Your Money

*Edited by Tom Henkel
And Bruce Hoard*



COMPUTERWORLD 

By Replacing 'Full Coverage' Terms Third-Party Leasing Beats IBM Hardware Costs

By Charles Greco
Special to CW

One way IBM users can hedge inflation is to replace leased IBM hardware with the same equipment supplied through a third-party lessor. This can sometimes save users money because third-party lessors generally charge according to the current market value of IBM hardware — IBM does not.

For example, my firm considered buying an IBM 2821-1 control unit. IBM listed the control unit as costing \$47,383, or \$1,000 a month to rent. We found the same 2821-1 control unit on the third-party marketplace for \$7,000.

Some shopping around can clearly save users money, but what about installed equipment? There is an answer there, too.

We were renting a 2821-1 from IBM until we found we could get a better

deal from a third-party lessor if we were willing to take the machine on a longer term agreement.

This transfer can be done rather smoothly. We notified IBM that we no longer wanted the hardware. We then made arrangements with IBM for its customer engineers to take out the controller. We then had the IBM customer engineers install the third-party controller at the same time; thus, no down time was experienced.

We took the 2821-1 from the third-party vendor on a 36-month agreement and paid IBM an additional \$101 a month for "prime-time" maintenance — meaning service would only be provided five days a week between the hours of 9 a.m. to 5 p.m.

The switch to the third-party lessor saved us \$624 a month. IBM charges \$1,000 a month to rent a 2821-1. The third-party from charges \$275 a

month. That, added to the \$101 monthly maintenance charges, comes to \$376 a month. If you subtract this from the original \$1,000 IBM charged, the difference is \$624 a month or an annual savings of \$7,488.

Two Differences

There are two distinct differences between the original IBM lease and the new third-party lease.

First, we extended the terms on the new lease to further reduce our payments to 36 months.

And secondly, we elected to go prime-time maintenance instead of the full coverage to reduce our maintenance costs.

The exercise just explained is by no means limited to a 2821-1 control unit and may be applicable to other installed hardware as well. "Bumping" hardware for less expensive used units

can save users thousands of dollars by reducing payments to current market value rates.

Except for the 4300 series and for some 8100 CPUs, IBM rental rates will generally include 24-hour, full-time maintenance coverage whether or not you want it. In most instances on units such as control units, disk drives, card readers and terminals, prime-time day shift coverage is adequate.

However, in order to reduce your maintenance costs by reducing your coverage, the units in question must be purchased. IBM will not allow reductions or changes to full-time maintenance agreements as long as it owns the equipment.

IBM Purchase Credits

IBM purchase credits can also be used to cut costs. The credits represent a percentage of your monthly rental payment to IBM which can be applied towards the purchase of that particular unit.

For example, if you have leased or rented a 3350 disk drive from IBM over the last 12 months, you have, in effect, accrued 12 months of purchase credits which can be applied and deducted from the purchase price of that disk drive should you elect to purchase. In some cases, these credits (and they vary with the hardware) can accrue in value to as much as 50% of the original purchase price over a period of time.

Purchase credits are great for those organizations who wish to purchase installed equipment and can afford to do so despite a tight borrowing climate and high interest rates. But for those who wish to take advantage of what in some instances can be "true" bargain prices without the cash outlay, consulting a third-party leasing company and exploring the possibilities of purchase leasebacks on the more highly accrued hardware is the best alternative.

Be cautious and do not be fooled by seemingly bargain purchases on your own or by the use of third-party par-

(Continued on SR/4)

Survey Sights 'Opportunity Value'

Office Tools Salvage 15% of Users' Time

NEW YORK — Managers and other professionals can achieve productivity gains with an "opportunity value" of more than \$100 billion by 1985 if they make full use of automated office tools, according to a recent Booz Allen & Hamilton, Inc. study.

The study revealed that an average 15% of managers' time can be saved through office automation, resulting in a significant boost in both private and public sector white-collar productivity.

"In terms of dollars, the annual opportunity value of this time savings is equivalent to 15% or more of operating income before taxes for the average large manufacturer, bank or insurance company," according to a Booz Allen spokesman.

"Instead of simply reducing staff, executives will likely be driven by their business strategy to reinvest this 'opportunity value' into expanding and raising the quality of output, avoiding future costs and enhancing the quality of work life," he added.

Year-Long Study

The year-long "Multi Client Study of Managerial and Professional Productivity" also found that managers and other professionals — "knowledge workers" — are spending anywhere from 15% to more than 40% of their time on less productive activities which they consider wasteful.

Such activities include doing clerical tasks, finding and screening the "right information," waiting idle while traveling, expediting previously assigned tasks and scheduling and organizing work.

The study probed the activities, output, working habits and attitudes of some 300 professionals in 15 major U.S. manufacturing, banking, insurance and government organizations.

Its purpose was to determine just how well justified automated office systems can be in terms of boosting the performance of the decision makers and professional workers in business and government.

"Mounting demands on managers and professionals and the impact of in-

flation could easily push their compensation cost to \$1.35 trillion by 1990," the spokesman said.

"However, the study shows that time savings with an opportunity value of close to \$300 billion can be realized annually by 1990 through the proper use of automated office equipment and services throughout the private and public sectors. And, the annual opportunity value of time saved by 1985 can amount to \$125 billion."

Here are some of the major conclusions that were reached:

- For those ready to move ahead aggressively, time savings of more than 9% annually appear achievable within the next 18 to 24 months, with a potential payback within slightly more than a year based on the opportunity value of time saved.

- Newer automated support tools can also significantly enhance the quality of work when incorporated into an overall program of upgrading

existing office support resources and improving certain professional practices.

- Business strategy will dictate the form in which benefits are taken. Therefore, full realization will require thorough top-down planning of the benefits sought and a thoughtful program to measure the gains.

- Certain office automation tools will contribute far more significantly to savings than others.

- The general receptivity to an office productivity automation program should be high since the work improvement goals of both management and knowledge workers appear to be reasonably similar.

Generic Departments

The study focused on departments generic to almost every industry, including marketing, personnel, purchasing, operations, information sys-

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Training Method Gets New Hires Up to Speed

By Pamela R. Pfau

Special to CW

Most people think we spend most DP dollars on hardware and software. But in reality, a large portion of most DP budgets is allotted for people.

The myth that DP systems will save labor costs has been disproved in recent years. Most DP departments have brought their companies not only higher costs for people, but also excruciatingly high turnover rates which compare poorly with other operating departments.

While some maintain turnover is healthy, and new people bring new ideas and thus upgrade the department, the bottom line of employee turnover is an expensive one for employers.

Salary and compensation plans have created the need for the professional DPer to frequently change jobs. The figure depicts the increments available to those people who change jobs and the pattern and potential loss for those who remain in place.

Compare the career paths of two hypothetical programmers. Programmer 1 and Programmer 2 started on the same job but Programmer 2 had a strategy of working each job only long enough to get the normal 10% salary increase each year. Then he would look for a new job and an average 20% raise.

The chart suggests where Programmer 2 would be with some luck and skill and perseverance to the game plan. In the real world, 18 months might be required to get a raise, assimilate a few buzz words and commit to the next job.

With a high turnover situation, it becomes even more important that the DP manager prepare the new hire for productivity. The manager must realize the new hire might not be around long enough to complete a project.

Time can not be spent letting a new hire read manuals for a couple of weeks and then attempt a little maintenance programming to learn the systems. There is also no time for him to follow a veteran around. The buddy system has been a popular training mechanism, but all it leads to is two people being nonproductive instead of one.

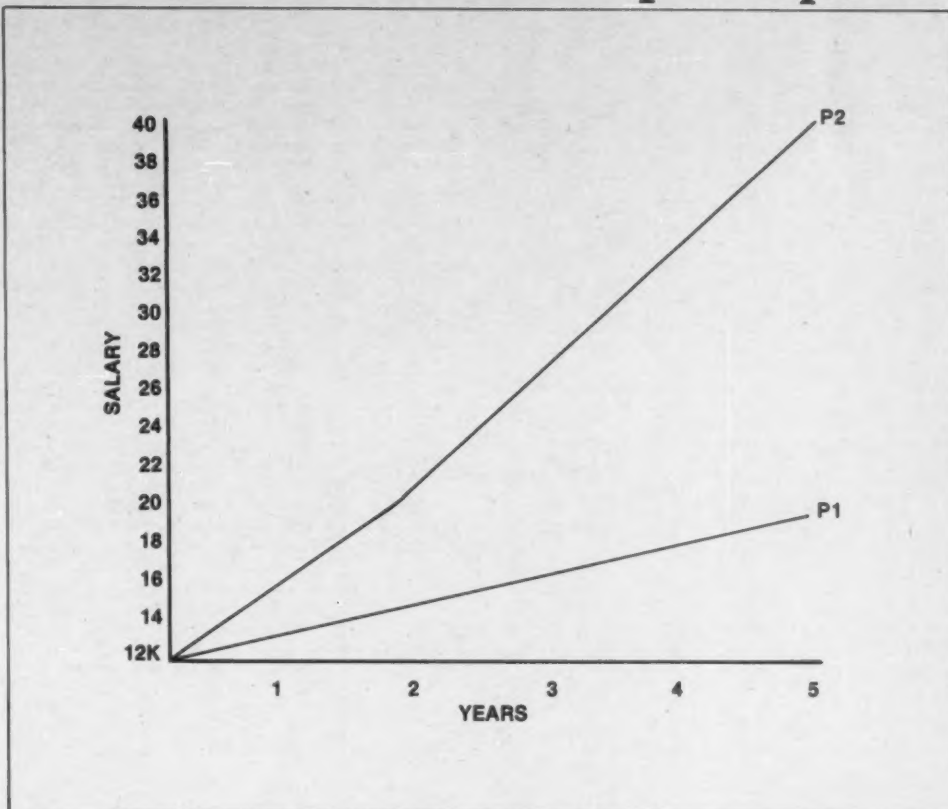
Better Way

A better way exists, but is seldom implemented in the small to medium-size shops and probably not at all where minis are in use. This better way is in-house training built around real-world case studies relevant to the jobs in that particular DP environment.

Let's start with the premise that documentation has been maintained. Procedures have been written for everything from operating the TSO terminal to creating test data and filing paperwork.

The object is creating a test case to take the programmer through the gauntlet of procedures during his first week on the job. The new hire will be assigned a monitor who provides guidance only when problems arise beyond the scope of the test case study. The test case should be completed in one week.

Completion should be measured against the previous performance of others as well as the correct results. More than one test case study may be



DP Salary Expectations

developed if the work suggests different levels of training.

Study of a test case will bring a new hire up to speed faster and give the DP manager an opportunity to make a faster judgment on his capabilities.

Training done by on-the-job osmosis, through vendor schools or at local institutions is now augmented by generalized video programs. While these methods have some value, they

typically require careful scheduling, excessive time and provide only generalized information. In addition, they usually do not provide the practical experience necessary for getting a job done in a particular environment.

The test case study approach is fairly easy to implement. It should be started with a task that has already been performed and typical of the type work the new hire will be expected to accom-

plish. A folder of all materials required to complete the job — when it was a real job — should be prepared. It should be readily available the next time there is a new hire.

Using test case studies, employers can maximize productivity by minimizing the time it takes to acclimate new employees.

Pfau is a consultant in New York City.

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Third-Party Leasing Slashes Hardware Costs for Users

(Continued from SR/2)

ticipants. As in our previous example of the 2821-1 control unit, the original purchase price was \$47,383.

Even when utilizing the maximum 50% of accrued purchase credits, the control unit's new cost would still be a whopping \$23,732 and still \$16,732 above market value! Purchase of this installed unit would obviously not be recommended. Its replacement with a market value unit would be the best course of action.

In some instances, however, when the supply of some equipment in the used marketplace dwindles and the demands increase, accrued purchase credits on installed equipment may become valuable.

For example, 3350 disk drives have been in great demand in recent months as reflected in the increases of lead times for IBM deliveries and dwindling inventories in the used market. Purchase prices for these drives have been hovering around 80% of IBM's original purchase price.

An individual who has had 3350s installed for a reasonable length of time and whose accrued purchase credits exceed 20% of the purchase price now has the ability to capitalize on his credits by executing a purchase lease-back transaction on the installed equipment.

Purchase Leasebacks

To demonstrate a typical purchase-leaseback transaction, let us assume for a moment that the purchase credits accrued on our 3350 amount to 50%: The IBM list purchase price for a 3350 B2 is \$31,680 and the same unit will lease for \$941/mo including maintenance.

When we apply our credits to the list price, the new cost for the box becomes \$15,840. Instead of replacing these drives as we did with our 2821-1 control unit, it now becomes advantageous to have a third-party lessor pur-

chase our installed drive and lease it back to us.

The following is a list of items which will help illustrate this purchase lease-back transaction.

- The initial lease term of the new third-party lease is 48 months.
- The 3350 B2 disk drive is not replaced and an IBM purchase of install contract is executed.
- The third-party lessor pays IBM's invoice for the new amount of \$15,840.

In the purchase-leaseback example, we took the 3350 from the third-party lessor on a 48-month agreement. The drive was not replaced by IBM and a purchase of install contract was issued. The third-party lessor paid off the new \$15,840 purchase price for the drive, and we asked IBM to place the drive on prime-time maintenance.

We saved \$325 a month on the deal because the original IBM rental rate was \$941. The third-party rental rate is \$488 a month plus an additional \$128 for prime-time maintenance. We pay \$616 a month, saving \$3,900 annually.

Again, the two major differences between the original commitments to IBM and the new third-party lease is the extended 48-month Prime-Time maintenance is used instead of the usual full coverage.

Greco is data processing hardware coordinator for Stop and Shop, a chain of grocery stores in the Northeast. He is also director of the Boston chapter of the Data Processing Management Association.

Office Tools Save Time

(Continued from SR/2)

tems, legal and customer service. Also studied were a variety of office situations, ranging from those where virtually no automation had been used to those where very sophisticated stages of automation had already been achieved.

In addition to identifying specific ways to attack less productive activities, the study identified and quantified significant opportunities for improving the quality and raising the productivity of more skill-related managerial and professional activities, such as meetings, telephone calls, reading, creating documents and analyzing.

For each of these activities, the study evaluated some specific gains that can be achieved through certain types of automation.

Advanced forms of word and image processing, for example, can enable knowledge workers to review and edit their work more efficiently, and new forms of personal computing can speed the process of making decisions and analyzing quantitative data.

Other forms of automation — retrieval of both internal and external information, various forms of electronic mail and several activity management aids — were also cited as potential productivity boosters.

The study is available from Booz Allen & Hamilton, 245 Park Ave., New York, N.Y. 10017.

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Cost Cut Choices Counted Plug-Compatibles Give Budget-Crunch Solution

By James D. West

Special to CW

PALO ALTO, Calif. — With the current tight money supply, many DP executives are leery of the large down payments, higher monthly charges and the possibility of lower trade-in values involved with buying new hardware.

In these times it is more important for users to carefully select hardware that provides the best overall value.

As costs go up and budgets either remain the same, or are cut, DP managers are faced with two choices in order to maintain services.

The first option is to cut back on staff. This decision allows for increased cost of compensation and education without increasing expenses. However, this approach will also severely impact the quality and variety of services that are normally provided by the DP department.

The second alternative is to save money on equipment. This approach allows for continued development and maintenance without increasing expenses.

One of the better ways to cut back on hardware costs is to look at plug-compatible manufacturers' (PCM) offerings.

The cost of DP equipment is made up of two general components — purchase price minus resale value and cost of operation (all costs associated with the continued utilization of a product). In comparing the purchase price of equipment with the IBM alternative, the PCM vendor can save the customer from 10% to 50%. But the resale value of the PCM product is usually lower.

Cost of operation encompasses both hardware and software support, power usage for processing, power usage and equipment required for cooling, and personnel to operate the product. PCM vendors sometimes offer alternatives using less power for processing and cooling, less equipment for cooling, the same level of operations personnel, and equal or better support of hardware and software for virtually the same price.

Resale Value

The last part of evaluating DP equipment cost is resale value. There are four major factors that determine resale value — product characteristics vs. alternative available products; support characteristics of the product vs. support characteristics of the alternative; the level of availability vs. demand; and suppliers' reputation in the market. These four factors can be further subdivided into definable characteristics that will determine a relationship between various products.

The first factor, product characteristics, includes items such as original purchase price, a measurement of performance, the reliability of the product, the compatibility with other products, the availability of predeveloped software and the cost of operation, to name a few. These items, and more, determine the relationship of PCM products to their alternatives.

As the result of the natural lag between the announcement and delivery of an IBM product and the announcement and delivery of a compatible product, the PCM is sometimes able to take advantage of newer technology

developed during that time. By using the newer technology, PCM vendors can often offer products with equal or better characteristics.

The second factor, support characteristics, includes service availability, service cost, software support, software enhancements, software support costs and so on. In an effort to provide the best available support at reasonable rates, PCMs have concentrated their efforts in certain geographic areas and created teams of specialists who may be contacted by their service representatives for service. In some cases this concept provides better customer satisfaction for virtually the same cost as IBM maintenance.

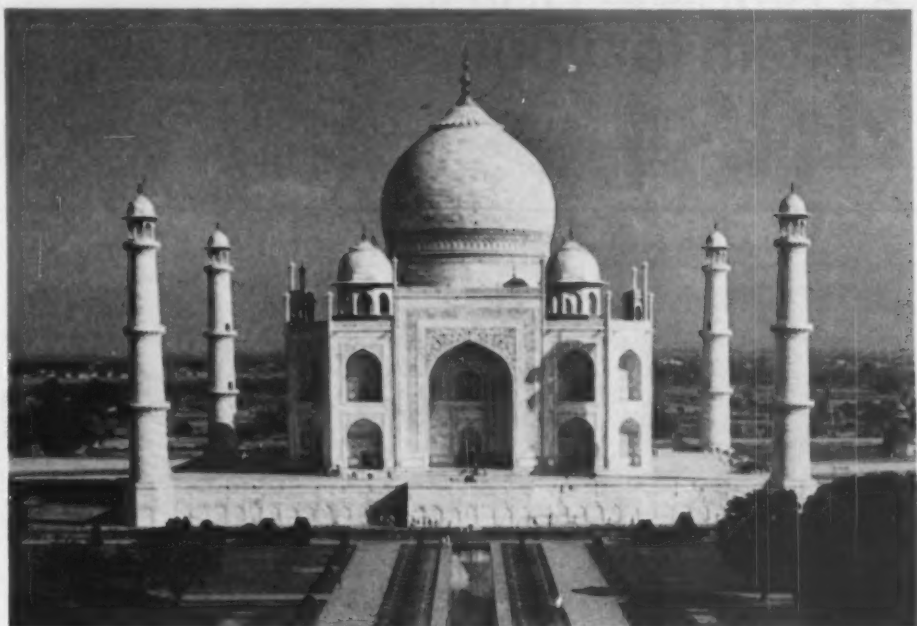
The third factor in determining resale value is product availability. It plays a primary role in holding a resale value artificially high only as long as acceptable alternatives are not available. Acceptable alternatives, provided by the PCM in a timely fashion and at lower cost, reduce the importance of this factor. Only when the supply of the product (or an acceptable alternative) becomes equal to the demand for the equipment will this artificial constraint stop establishing high resale values.

The fourth factor that determines hardware resale value is the vendor's reputation. So far, this has been the hardest hurdle for the PCM to overcome.

Many feel the PCMs have made strong headway in the other areas by offering good products at lower prices and by giving a sense of stability through good business practices. But only by continuing that philosophy will PCMs manage to become accepted in the IBM marketplace.

In the years to come, this should happen. Residual values of PCM hardware should start to pick up to offer users not only a 10% to 50% savings on the purchase price, but a higher trade-in value as well.

West is a financial analyst for National Advanced Systems Corp. in Palo Alto, Calif.



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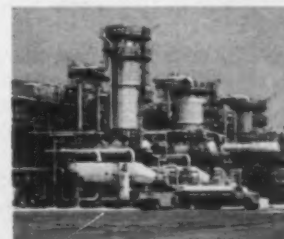
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Borrowing Software Eases Development Burden

By James M. Clark

Special to CW

Most firms eventually reach a point in the software development cycle where they must decide whether to develop applications programs in-house or continue to buy packages from software developers. There are advantages and disadvantages to both methods, and there is an alternative — borrowing software from someone who already has de-

veloped a similar application.

Developing their own software gives users the opportunity to develop the application exactly to their firm's needs. It will completely satisfy the user, the maintenance staff and the operations people. And it will also keep the development staff busy.

An in-house-developed application will be built to fit the system and can be adapted to the current system; it also

holds provisions for future upgrades. In addition, since the programming staff built it, they know it intimately and will know how to quickly change or modify the package.

Some Drawbacks

But building your own applications has some pitfalls, too. It will probably take longer, cost more and involve more staff than you ever dreamed. You will probably wind up ex-

panding your staff to complete the project, and the finished package probably won't work as well as originally conceived.

When you buy a package from a software house, it will probably cost less than developing it from scratch. And those packages can usually be implemented and operational in a very short time.

But a firm must also make some changes and confessions

to its manual procedures to conform to an outside package's requirements. Those changes may turn the DP manager into a sort of company Benedict Arnold.

Software house package code is often generalized, archaic and inefficient. The only way to get a state-of-the-art package from a vendor is to buy the first one it makes. In the 100th copy, the code will be so basic that it will run on the lowest level Cobol compiler and will probably contain things like hand-coded binary searches for table lookups.

Also, vendors' package program code and documentation may not fit your shop's standards, and someone from the DP staff will have to identify, evaluate and select the appropriate application.

Maintenance is also difficult on a vendor's package since no one in-house is familiar with it.

Another Route

If a user can't decide whether it's better to build a package from scratch or buy a software house's, there is an alternative. Wait until someone else develops a similar package and borrow it.

Start by calling someone with your job at another company in the same industry. Ask what the other firm is doing for an order entry program, for example, and offer to take the DP manager to lunch.

You'll probably find the competition's DP manager is more than happy to talk about his research, progress and problems with his software.

Once you get the details from the other DP manager, you've got the basis of a good customized application program. Get copies of the I/O layouts and forms from similar packages commercially available and try to glean the best from all the options you see. Then call your favorite contract programming house.

Borrowing software is the best of both worlds. The package is developed essentially in-house, using your own project team, with the help of some contract analysts and programmers. The package will be built for you, but with a breadth and vision not always obtainable from your staff. Bids can be let for fixed-price development and control costs. And end product responsibility can be assigned to the contracting firm to ensure well-tested and acceptable software.

Clark, an account manager for Technalysis Corp., has been in the DP business for the past 13 years as a programmer/analyst, project manager and account manager.

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When Packages Don't Deliver

In-House Development Targeted for Cost Cut

By Gary Guttman

Special to CW

NEW YORK — Application system development, maintenance and enhancement often account for more than half of the typical DP budget. On that basis alone, it's clear that improving the application development/maintenance cycle is the most effective way to get more DP for the dollar.

Packaged software is one way to save both money and time for many applications. Yet there are business situations that just can't be handled by packages. That still makes in-house development an important part of most DP operations — and the part that needs the most help.

When the traditional approaches to developing applications are used, DP frequently doesn't deliver what it promises. Too often, system development projects are difficult to manage and behind schedule. The program development and testing process quickly becomes a frustrating bottleneck and documentation becomes an unwanted stepchild that never gets a fair share of attention. Final products often don't meet user specifications or expectations and computer-based programs sometimes turn out to be costly, non-standard maintenance problems, instead of efficient, smooth-running links in the production chain.

In short, it repeatedly costs too much and takes too long to develop what turn out to be disappointing DP systems.

As the logic of DP applications becomes more complex, traditional system development methods become even less acceptable. The old techniques mean that applications programming is becoming more labor-intensive at a time when skilled programmers and analysts are getting harder to find and more costly to hire and keep.

Reinventing the Wheel

Improvements in software production have been made over the years — by introducing structured methods and by making programs as modular as possible, for example, and by developing table-driven systems and by relying more on data base management systems — but many of the same DP problems are still being solved over and over and many of the same mistakes are being made over again.

Today it is more important than ever to make the best use of available talent by focusing that talent on the most critical software development problems. Experience shows, however, that typical business applications have as much as 80% to 95% commonality in program code and that programmers spend much more time in routine, essentially redundant, coding than in addressing the smaller but unique portion of each program's logic.

One of the recurring problems in software projects is the lack of good solid analysis in the beginning. Because DP organizations are costly to maintain, there is often a rush to get into coding without sufficient user involvement, without a clear system definition or the appropriate level of specification and without clarity about the system design itself.

Traditional approaches to system de-

velopment often fail to include adequate system design or programming standards. As a result, they promote higher maintenance costs and problems in continuity. Even when standards are called for — perhaps especially with structured programming — they become goals in themselves and distract program builders from user needs.

Attention to Whole

An uneven, nonstandard approach to software development that does not address the entire life cycle of an application system is invariably costly. About half of any software effort is spent removing defects, and the cost to

make corrections increases exponentially as the system life cycle goes on. It costs nearly 40 times as much to remove a defect during testing as it would if it were caught in system definition and design. Removing defects after a system is operational can cost more than 100 times the cost of earlier detection.

It's often the maintenance portion of the system life cycle that is the most frustrating. Maintenance developed in the traditional way often locks good people into systems they developed and requires redundant, uninteresting work offering little challenge for skilled, experienced people. Typically systems are poorly documented and

systems and program structures do not follow any consistent standards.

Management typically relies on oral communication among technicians and hopes knowledgeable people can be retained. It's clear that controlling and reducing maintenance costs and problems can have a significant economic benefit to a DP organization.

Today's business environment needs an approach to DP systems that enhances management control over the application development process, increases programmer productivity and lowers the cost of developing software while shortening its production time, improving its quality and simplifying

(Continued on SR/8)

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Small Business System an In-House Alternative

ELLCOTT CITY, Md. — There is an alternative to traditional in-house systems and remote processing services. The small business computer has skyrocketed in popularity over the past five years and decreasing hardware prices can only bode well for their future, according to the recent Newton-Evans Research Co. survey.

Chiefly designed for use in accounting and other general business applications, small business computers are generally found in firms with annual revenues of \$500,000 and up.

Small business computer proponents cite increased labor productivity and improved management efficiency as two benefits, the survey maintained. Improved customer service was also mentioned.

"With automated records, customer records and information are more readily accessible than manual files and often the computerization permits timely handling of customer inquiries," the survey said.

Look Before Leap

While some remote processing services users who have moved in-house have successfully implemented more applications at a lower cost than if they stayed outside, others have plowed ahead on the small business computer course without first analyzing where it would take them.

In order to avoid an ill-advised small business computer purchase, it is advisable to undertake a feasibility study to measure the potential costs and ben-

efits of a small business computer vs. remote processing services.

Turnover and training of computer personnel, space requirements, management reporting relationships for the DP department, decisions on upgrading the system and who uses it and when are points to consider.

Installation and implementation time is one factor frequently overlooked by would-be small business computer users. Under optimal conditions, that period can range between one and two years. "These hidden costs of an in-house computer capability and the tendency to use the systems for more applications of marginal value simply because it is there, mean careful cost considerations must be made," the survey reported.

"More often than not, remote processing services will prove to be less expensive than the small business computer when all these costs are taken into consideration," it concluded.

The applications and systems software problem must also be taken under advisement. Unless software is available or can be developed to satisfy the user's needs, the most expensive and sophisticated piece of hardware will be of little or no use to the firm.

Ways Out

One way out of that dilemma is to rely on systems houses and turnkey software vendors to write the application packages, the survey notes.

Another is the standard application package approach. However, such a tack is dependent on finding a pre-programmed application package that will totally satisfy the user's needs.

The potential user may want to evaluate a flexible software package in which users can alter parameters to fit particular requirements. The problem is, most software applications have limited flexibility.

The standard application package may also have gross operating inefficiencies regarding use of computer system resources and throughput time. If these inefficiencies are substantial, a potential small business computer user may be compelled to purchase a larger configuration than originally required just to accommodate a certain package.

"As a way to gain first-time exposure to computerization with minimum investment and relatively low cost, a remote processing services offering may be a better alternative," the survey declared.

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In-House Plans Reduce Costs

(Continued from SR/7)

its maintenance. Such an approach should address the entire system life cycle, from design and development through maintenance and enhancement, and should provide clear and easily maintained documentation of an entire application.

A project should start with an analyst and a user working together to identify what the user wants out of the system, what information is needed to produce that output and what files and programs are needed to transform the input into the output. When that data is entered, a hard-copy design manual describing, in detail, the proposed system is generated.

Analyst and user should review and revise the manual until they agree that the system described is the system they want. The system then creates most of the common logic and provides the coder with good sophisticated tools to define the remaining application-specific portions of the required programs.

Guttman is president of Genasys International, Inc., which offers an applications development package called Genasys.

Good Through the '80s COM Price/Performance Leads Storage Media

By Bud Sulter

Special to CW

Although in 1967 doomsayers predicted computer output microfilm (COM) would soon be replaced by electronic storage and retrieval, nearly two-thirds of all computer sites in the U.S. currently use COM as an output medium in one form or another.

A close look at COM vs. competing processing and storage media reveals COM has considerable staying power and will remain the most cost-effective medium through the late 1980s.

Comparative factors should be taken into consideration to determine whether or not one technology has the potential to replace another:

- The frequency of updates of the data.
- Whether the medium is volatile or nonvolatile.
- The length of the storage period required for the data.
- Whether the technology is read-only, or read/write.
- The size of the data base.

The cost of storing data is perhaps the most significant basis for comparison and the most easily understood. The costs compared in this analysis are end-user hardware and media costs for the different technologies and include all elements of each technology that are required to store and retrieve data locally (i.e., no communications costs are required or included). The costs of the technologies which follow are shown on Figure 1 on a per megabyte basis.

Random-access memory (RAM) is the most expensive storage medium as indicated by starting at the top of the hierarchy shown on Figure 1. The semiconductor cost per megabyte of data stored represents the present cost for 64K-bit chip density on very large-scale integrated metal oxide semiconductor circuits, and the cost projection through 1990 represents a continuation of the trend over the last 10 years of increasing density and lower costs: 1982 - 128K bit per chip; 1990 - 1M bit per chip.

Variations on this technology, such as electronically programmable read-only memories (Eprom), offer similar performance at the same order of magnitude of cost, but offer other features. In the case of Eprom, for example, the data is not lost when the power is turned off as it is with ordinary random-access memory.

Ebam Technology

Electron beam accessible memory (Ebam) is a 30-year-old technology, but there are presently no commercially available units. These electron

beam devices are miniature cathode ray tubes that store bits of data randomly on a silicon dioxide target. The data is read back at a lower power.

Even though Ebams are fast access devices, their cost effectiveness is limited to large memories due to the high costs of overhead or access circuitry and the cost of fabricating the Ebams themselves.

Charge-coupled devices (CCDs) are commercially available from Fairchild Camera and Instrument Corp., Texas Instruments, Inc. and others, and are relatively cost competitive with semiconductor RAM today. These devices store data as charges on small capacitive nodes. Increasing areal data densities will result in lower costs during the 1980s.

Bubble memories in chip and board form are also being sold today in products such as the TI 765 terminal or the Rockwell International, Inc. POS/8 terminal. TI is producing chips today, for example, with 92K bits of storage capacity per chip. This technology is less expensive than semiconductor RAM and is projected to continue to increase its cost advantage through the 1980s.

Winchester Devices

The magnetic disk line represents IBM 3370 Winchester level of technology as announced in 1979. Winchester, or thin film, technology goes back to the early-to-mid-1970s, and the IBM 3370 is the latest device in this line of hardware evolution.

The projected reductions result from increasing areal densities. The presently accepted theoretical areal density achievable in the thin film magnetic domain is somewhere below 10^6 bits per square inch. The current state of the art is IBM 3370 density, which is greater than 10^5 bits per square inch. The improvements represent increases in density to the presently accepted theoretical limit.

The magnetic tape costs in 1980 represent current 6,250 byte/in. densities on one-half-inch magnetic tape. Improvements in cost per megabyte are forecast because of increases in areal densities to 25,000 byte/in. over the next several years. The future appears bright for magnetic tape storage systems as a result of the favorable economics and the advent of such techniques as streaming to provide magnetic disk backup.

Magnetic mass storage represents the IBM 3850 cartridge tape storage system. The data cartridges in the 3850 contain 3-in. wide magnetic tapes that are each 770 in. long, each of

(Continued on SR/10)

COMPETITIVE STORAGE TECHNOLOGIES

TECHNOLOGY	COST PER MEGABYTE				STORAGE DENSITY (MEGABYTES)	ACCESS TIME (SECONDS)	VOLATILE OR NON-VOLATILE	STORAGE LIFE (YEARS)	READ-WRITE OR READ ONLY
	1980	1983	1985	1990					
SEMICONDUCTOR	\$15,000	\$7,500	\$3,750	\$2,000	1	1×10^{-7}	V	0	R-W
EBAM	NA	NA	12,000	12,000	0	1×10^{-6}	NV	0	R-W
CCD	10,000	4,300	2,400	000	1	1×10^{-4}	V	0	R-W
BUBBLE	10,000	2,900	1,250	000	1	1×10^{-3}	NV	1	R-W
MAGNETIC DISK	41	30	19	5	570	2×10^{-2}	NV	1	R-W
MAGNETIC TAPE	4.21	3.01	3.25	2.52	5000	7×10^{-1}	NV	10	R-W
MAGNETIC MASS STORE	5.00	4.00	4.33	3.35	402,500	1.8×10^{-1}	NV	1	R-W
OPTICAL DISK	NA	0.00	0.00	0.00	2,000	3×10^{-1}	NV	10	RO
OPTICAL DISK PACK	NA	NA	1.00	1.00	125,000	7.5×10^{-2}	NV	10	RO
OPTICAL DISK MASS STORE	NA	NA	NA	0.000	25,000,000	3×10^{-1}	NV	10	RO
COM 48K	0.67	0.05	0.04	0.01	250	1×10^{-1}	NV	100	RO
COM 48X	0.06	0.00	0.00	0.00	2,000	1×10^{-1}	NV	100	RO
COM 05X	NA	NA	0.23	0.23	1,000	1×10^{-1}	NV	100	RO
COM 05X	NA	NA	0.03	0.03	10,000	1×10^{-1}	NV	100	RO

Figure 1. Hierarchy of storage needs shows significant cost differences for the different performance characteristics of technologies shown. Even with the spectacular cost improvements in semiconductor, the cost of semiconductor remains several orders of magnitude greater than tapes, disks or COM.

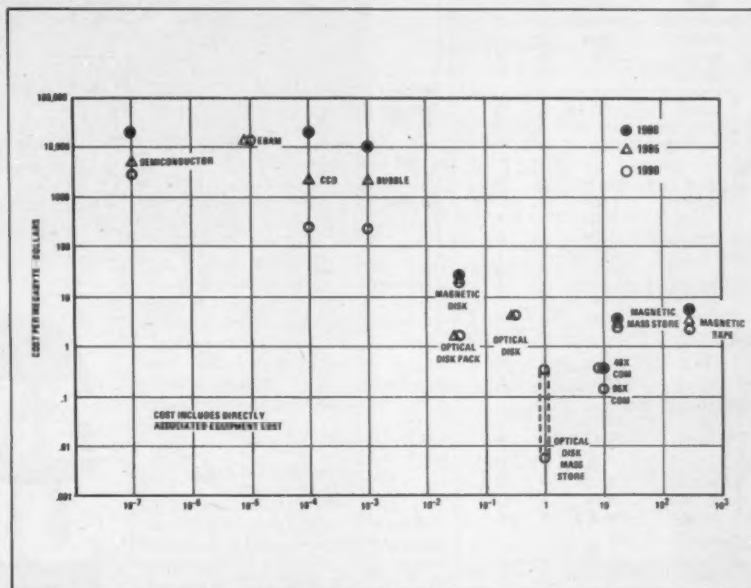


Figure 2. Note that the only technology with potential to achieve the cost performance of microfilm is optical disk mass store.

TYPICAL FICHE DATA BASE

A	B	C	D
ACCOUNT	APPLICATION	NO. OF FICHE IN DATA BASE	VOLATILITY
SMALL BANK	BRANCH LEVEL CUSTOMER INFORMATION FILE	2-3	DAILY
SMALL BANK	TOTAL CUSTOMER INFORMATION FILE	12-15	DAILY
MED. SIZED BANK	BRANCH LEVEL CUSTOMER INFORMATION FILE	4-5	DAILY
MED. SIZED BANK	TOTAL CUSTOMER INFORMATION FILE	80-100	DAILY
MED. SIZED BANK	LOAN FILE	30-40	WEEKLY
MED. SIZED BANK	YEAR END HISTORY FILE	200-300	YEARLY
INSURANCE CO.	AGENT LEVEL CUSTOMER FILE	1-2	WEEKLY
INSURANCE CO.	DISTRICT LEVEL CUSTOMER FILE	80-100	WEEKLY
U.S. NAVY	LISTINGS FOR SUBMARINES	30-40	QUARTERLY
MOTEL CHAIN	MOTEL LISTINGS	1-2	WEEKLY
MOTEL CHAIN	RESERVATION CENTER MASTER LISTS	5-8	WEEKLY
BUS COMPANY	PAYROLL, AP, AR	2-4	DAILY
BUS COMPANY	GEN'L LEDGER		

Figure 3. COM Microfiche (or microfilm) data bases tend to be relatively small. More than 90% are less than 100 fiche (200 M bytes).

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M4050	CMCX-FF	4	5
M4130	CMVII	9	10
M4190	CX-3D-C	9	10
M4451	CX-DD-185	9	10
MSUH64/168	CMIII-75	9	10
9323, 9324			

IBM

1810, 2310, 2315	CMII-LD	9	10
5440, 5444	CMIII	9	10
1311, 2311	CMVI	5	6
2314, 2319, 5445	CMXI	5	6
3300-1, 3336-1	CMCX-Sld	3	4
	CMCX-FF	4	5
3330-11, 3336-11	CX-DD-Sld	3	4
	CX-DD-FF	4	5
3340-70	CMXL	9	10

NCR

656	CMIII	9	10
657	CMXI-FF	5	6

SINGER FRIDEN

41	CMVI-50	5	6
41C	CMXI-50	5	6

TI

DS31, DS32	CMII	9	10
DS10, DS44	CMIII	9	10
DS530	CMCX-S	5	6

UNIVAC

B07 System	CMIII	9	10
8411	CMVI	5	6
8414, 8424, 8425	CMXI-DD	5	6
8440	CMXII	5	6
8430	CMCX-FF	4	5
8433	CX-DD-238	9	10

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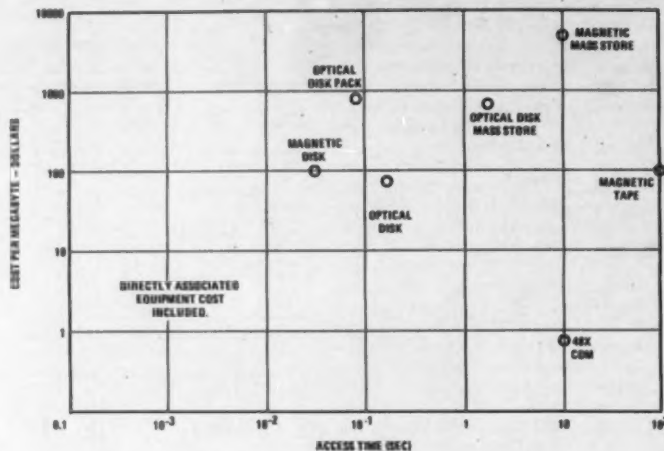


Figure 4. Even for a large COM data base (250 M bytes), COM is projected to be nearly two orders of magnitude less costly through 1990 than optical disk or magnetic tape.

(Continued from SR/9)

which holds up to 50M-bytes of data. Up to 9,250 of these cartridges can be arrayed in one 3850, resulting in a total usable storage capacity of 462,500M bytes.

Increasing areal data density and hardware developments are responsible for the cost improvement through 1990. These mass storage units fulfill a need in the hierarchy of storage technology requirements, but their slow speed may require intermediate dedicated magnetic disk drives to read data in and out at speeds acceptable to modern CPUs.

Optical Digital Data Disks

Optical disks, disk packs and optical disk mass storage devices are not available today. However, North American Philips Corp. and other companies are developing prototype systems that will be available as early as 1981. These systems will record data in concentric patterns of dots on 12-in. disks similar in format to magnetic disk products.

The storage capacity of these laser-based devices must be considered when comparing the economics of optical disks with other technologies. These optical disk capacities are large, and a large data base size is essential to the cost competitiveness of this technology.

A single 12-in. optical disk platter can store in excess of 1,200M bytes per side (up to 2,500M bytes per disk). These data densities are presently being achieved by companies such as Drexler Technology Corp., one of the early leaders in media development, and North American Philips.

Economically viable systems based on optical disk technology are not expected to be a factor before 1984.

Computer Output Microfilm

COM will continue to have improved economics based on the established trend toward higher data densities. The practical optical limit that can be maintained in a production COM environment is expected to be a 96X re-

duction ratio, and the utility of this reduction ratio has been demonstrated by laboratory tests. The predominant densities are 42X and 48X (shown).

Specialized two-step image reduction processes in use today resulting in 210X or higher reduction ratios on mi-

crofilm require expensive laboratory environments to produce microfilm and are therefore not projected to be the ultimate COM reduction ratio in widespread use.

The more conventional COM re-

(Continued on SR/12)

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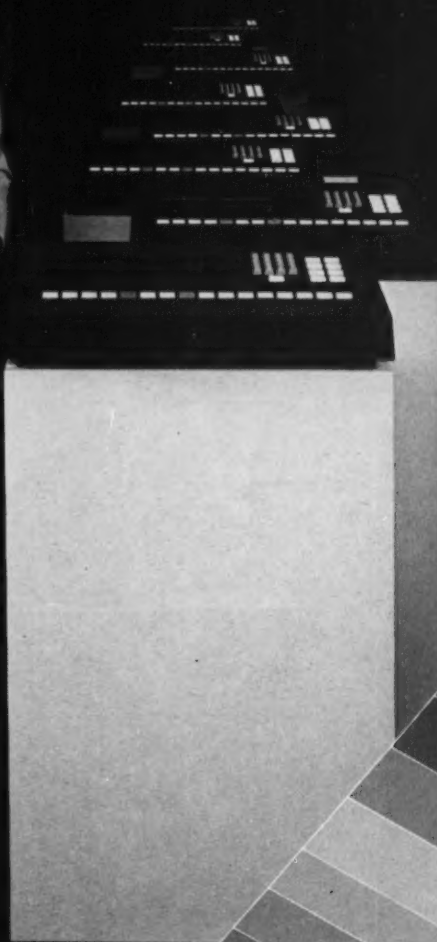
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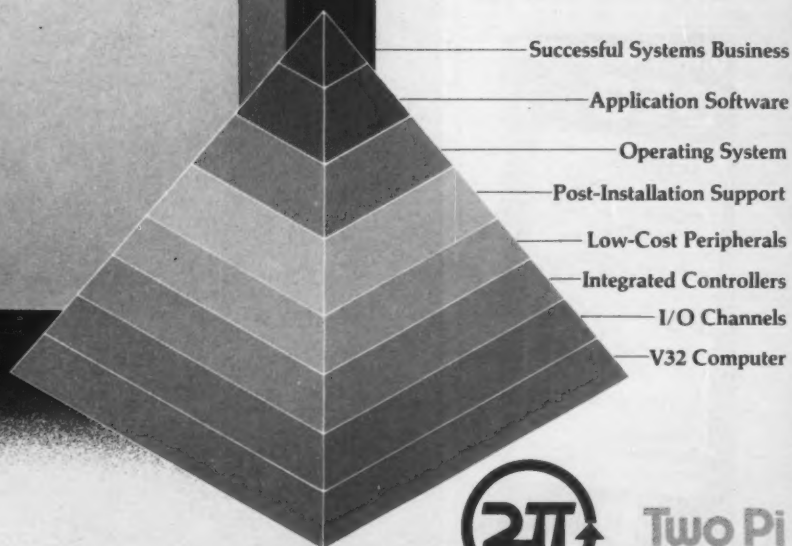
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COM Price/Performance Leads Storage Media

(Continued from SR/10)

coders with 42X to 48X reduction capability are widely used today in large data processing centers around the world. At Dec. 31, 1979, more than 5,000 such systems were installed, and this base grew at over 16% in 1979.

COM mass storage systems have not been included in this analysis because COM data bases of sufficient size to justify mass storage are almost nonexistent.

Graphing the Cost Comparison

When the cost/speed data from Figure 1 is plotted on a semilogarithmic graph, the results are as indicated on Figure 2. This graph clearly shows the hierarchy of storage technology costs versus access time, and shows that for large data bases the only technology that may become cost competitive with COM is the optical disk mass storage system.

Other technologies will remain at least one order of magnitude more costly, and in the case of semiconductor RAM storage, will remain at least four orders of magnitude more costly than COM through the 1980s.

However, competing technologies should be compared on the basis of a typical end-user data base size for specific applications rather than on the theoretical capacity of a hardware device.

Typical examples of COM data bases are described in Figure 3. On two or three 42X fiche, one can easily store 4M to 6M bytes of data at 2M bytes per fiche, and a large number of COM applications fall into that size range.

For example, one small bank with less than \$100 million in assets has a branch-level customer information file of 2 to 3 fiche which is updated daily. Our research has shown that more than 90% of all COM data bases are less than 100 fiche (200M bytes).

Spread Will Increase

However, even a large COM file of 125 fiche, such as the total customer

information file at a medium-sized bank, is a relatively small file when comparing storage capacities of the alternative technologies. If a 125-fiche data base (250M bytes) is compared with the apparently cost competitive optical disk, COM is projected to be nearly two orders of magnitude less costly by 1990. This is shown dramatically in Figure 4.

When the cost of duplicates and the distribution of duplicates is considered, the cost differential between COM and optical disk will become even larger. The cost of COM duplicates compared to originals drops by a factor of three due to the lower cost of diazo and vesicular media for duplicates as opposed to the silver-based media for originals.

The optical disk duplicate cost is projected to be equivalent to the original cost since the replication process and media cost are identical to the process for recording the original. The average number of duplicates on a COM-generated data base today is approximately four and is increasing, which will increase the cost advantage of COM.

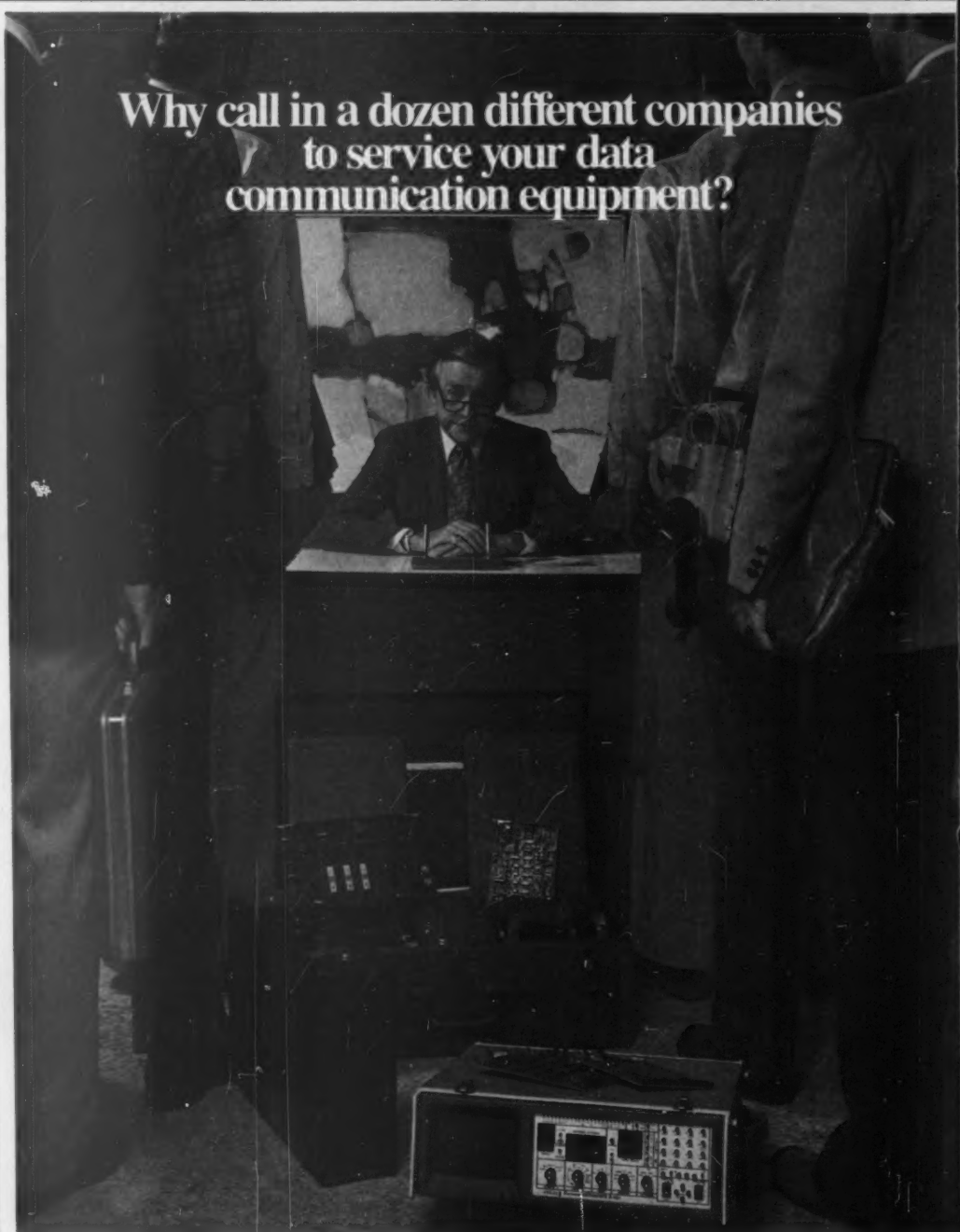
The optical disk will clearly not displace COM during the 1980s for today's COM applications. Applications for optical disks will be extensive and growing through the late 1980s, but will be oriented toward very large data bases (1G to 2G bytes or more). For example, large source document data bases which are relatively un-

changing: insurance company records, federal government weather records, radiographic files, land title records; and perhaps as replacements for large magnetic tape files.

In summary, all of the technologies discussed have advantages or disadvantages that dictate a set of applications for which each technology is most appropriate.

Computer output microfilm is suitable where low cost is important; where rapidly changing data bases are used; where the need for long-term storage is required; and where data bases are relatively small (under 500M bytes).

Suiter is director of planning at Data-graphix, Inc.



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For Multivendor Shops Third-Party Upkeep Proves Equitable Solution

By Stephen J. Keane

Special to CW

It used to be, when you bought or leased a computer system, you took everything, CPU and peripherals, from the same vendor. And that vendor was always called upon to maintain the system, too. To do otherwise was considered a sort of DP heresy.

But the computer industry is changing. More users are building systems from several vendors' offerings. And as many systems grow older, users are finding the OEM charges too much for maintenance. Others have found their DP sites are too far from the nearest OEM office to receive the kind of service they need.

Some users have found that contracting for maintenance from a third party is an equitable solution. The big advantage is that third-party maintenance costs an average 8% to 20% less than the same service from the OEM. And a centralization of maintenance responsibility eliminates the finger pointing that sometimes occurs in a multivendor configuration.

Balanced Combination

The service provided by independent firms should be a balanced combination of two types of maintenance: remedial and preventive.

Most users readily appreciate the value of fast and reliable remedial

maintenance. When something fails, they want it fixed — immediately. Some companies, however, still consider preventive maintenance unneces-

guarding against equipment problems is equal in importance to being able to solve them quickly when they do occur.

'The big advantage is that third-party maintenance costs an average 8% to 20% less than the same service from the OEM. And a centralization of maintenance responsibility eliminates the finger pointing that sometimes occurs in a multivendor configuration.'

sary and a waste of machine-time.

Actually, the opposite is true. Preventive maintenance ensures against equipment failure and helps prevent repair expenses. And in light of the sophistication of today's DP equipment,

The complexity, maintainability, failure ratio and type of system to be serviced determines the fees charged by independent maintenance firms, as well as the extent of maintenance responsibility assumed. In most cases the independent firm will thoroughly inspect each end-user system and arrive at an annual service fee, usually paid in monthly installments.

Most third-party maintenance contracts cover complete systems (components, peripherals, auxiliary equipment and so on) and provide price protection to the user for one year.

When contracting for maintenance, the customer and the independent maintenance firm should work closely together to determine the scope of services to be provided. For example, determining exactly what equipment will be covered and whether the customer requires service protection beyond the normal workday; i.e., whether the independent maintenance firm should have servicemen on call eight, 12, 16, 20 or 24 hours a day. Extended hours protection usually carries a premium rate.

The service firm should be knowledgeable of the company's work routine to ensure that preventive maintenance can be scheduled so it will not interfere with processing deadlines.

Also, consideration must be given to such factors as the proximity of service and support locations, each firm's average response time to service calls, the extent of spare parts on-hand at service locations, the range of services provided, and the types of test and diagnostic equipment available.

Training is also a key. As new, increasingly more sophisticated equipment is introduced, the task of maintaining and servicing systems is more demanding. The prospective customer should carefully examine the training programs of each independent maintenance firm.

If training is not an ongoing process or a high-priority activity with sufficient funding invested in modern training tools such as closed circuit television and video tape playback units; and if the firm does not keep pace with manufacturer changes and modifications; the end user should consider another vendor.

Keane is president of Sorbus, Inc., a third-party maintenance firm.

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Remote Service Selection Procedure Outlined

ELLICOTT CITY, Md. — Once the decision has been made to employ the services of a remote computing service, users should perform an eight-step procedure for planning, selecting and managing the service's activities, according to the results of a Newton-Evans Research Co. survey on remote computing services.

The first step is the development of an overall policy. This statement of policy should specify each level of management responsibility pertaining to the remote computing service's evaluation and selection process and to the usage of the service within the organization, the study said.

The statement need not be lengthy, but it should be formalized by having it written and published as part of the

organization's policy guide.

Selecting an administration is the next step. Someone within the organization must assume responsibility for coordinating the monitoring of all remote computing-related activities, the study said.

"The person assigned to the position should be familiar with DP fundamentals, comfortable working with user department representatives, able to understand and apply budgeting techniques and able to discuss organizationwide or project-based remote computing needs intelligently with vendors," the survey noted.

Project Definition

Next in line is the development of a project definition statement. This

starts with a determination of user requirements within the organization generally and should include current usage patterns, current computing resource available and forecasted computer application requirements.

Once the list of requirements is complete, an evaluation of alternative sources of data services should be done. Finally, general recommendations and an impact statement should be prepared, according to the study.

User requirements of a specific nature, for a specific application, must also be defined. At a project level, the requesting user working with the remote computing service administrator should develop a project definition statement by answering the following:

- What is the problem or opportunity?

nity?

- What are the objectives, expected results and benefits of the project?

- What is the plan of action to solve the problem or take advantage of the opportunity?

The fourth step involves searching out vendors. The Yellow Pages are a good place to start and professional organizations such as the Data Processing Management Association and the Association of Time-Sharing Users are also good sources, the research firm suggested.

Once a list of vendors is in hand, the user should prescreen the vendors and their capabilities. Then a candidate slate should be compiled based on answers to questions on hardware compatibility, operating systems, applications libraries, support resources and training and documentation, plus other pertinent areas, Newton-Evans said.

Load Profile

Step five calls for the construction of a load profile of the organizational work load and/or the proposed system. On an organizationwide level, service requirements can be developed using a questionnaire process to determine the nature of additional computing service requirements, the study claimed.

The nature of such requirements could be of two types: supplementary to existing computing resources or complementary to existing DP resources.

Taken into consideration should be the spectrum of users who need to access the computing service, professional or nonprofessional computer programmers, the need for interactive or remote batch services and the languages required. In addition, applications software requirements and the overall level of self-sufficiency in using DP services should be considered, the report maintained.

"Once completed for both an organization generally and the specific project, the detailed load file will provide much of the information on which to base a cost estimate for remote computing service usage. At this point, it will also be possible to determine suitability of services under consideration, the study said.

Request for Proposal

Step six is the preparation of a request for proposal (RFP). The RFP should reflect input made to the load profile but phrased to present service needs as minimum requirements, leaving responding vendors some degree of upward flexibility in the RFP.

The user should pay particular attention to vendor statements on data and program integrity, security and systems backup capabilities, the report noted. Questions of program ownership (if the vendor will be involved in development of programs) should also be addressed.

Prepare, run and evaluate a benchmark for step seven. This is an important, but often overlooked, procedure, according to the study, because it requires the time, resources and energy of both the service's administrator and users. This step contains three major activities areas:

- Writing or formulating the set of
- (Continued on SR/18)



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The source. Of course.

ANDERSON JACOBSON

Newton-Evans Survey Finds Users Win and Lose With Remote Computing

ELLICOTT CITY, Md. — The rapid growth of the remote computing services industry has created a plethora of opportunities to save — or lose — money in DP. A recent survey conducted by the Newton-Evans Research Co. details this growth area and suggests guidelines for participating in it.

Back in the salad days of computing, the DP manager often reigned supreme. Endowed with the rare knowledge of computers, he called the tune to upper management when it came time to buy, and his budget was often open-ended.

The stark economic realities of the late '60s and early '70s brought an abrupt end to the "fat cat" days of data managers, and shrunken budgets put the pinch on big spending. Combined with the heavier and more sophisticated demands for computing, these factors forced more users to look outside for their processing needs.

Seeking Outside Help

There are several reasons for going outside the company for computing services. As the Evans survey noted, "By its very title, the remote computing services industry has a different perspective on its product. The product is not hardware, software or systems, but services.

"This service organization — one in which users enjoy the benefits of computerized applications without the problems of ownership — is the industry's greatest strength."

And, in the eyes of some users, a weakness. Just as there are plenty of happy-ending vignettes in which beleaguered user meets opportunistic service bureau and both live happily ever after, there is also no dearth of literature on users who have freed themselves from usurious service contracts and saved scads of cash by bringing it all back to the shop.

Questions Raised

The question is, where is the fine line and what are the basic criteria for making a decision? The Evans survey raises some questions for the user to answer before moving either way.

• **Is there a proper amount of expertise in the users problem area?** In many cases it is found that an in-house computer organization does not have specialists in many areas requested by user organizations," according to Evans.

Sometimes, the DP department can train someone to fit the bill. However, in many cases, the problem is too complex and requires a prohibitive amount of training.

• **What is the risk in developing programs?** "If the organization does not have experience with an application area, it becomes extremely difficult for the user to accurately plan the cost and time required to develop programs," the survey said.

One thing to consider here is that cost may appear less when plans are fashioned to keep the application in-house, but the risk of overrun is higher.

• **What is the internal situation?** "The user should attempt to gain an understanding of the attitude held by DP management and staff about his particular organization and their ex-

perience working with his function on similar efforts in the past," according to the survey.

The questions that need to be asked here are: What is the prevalent attitude on this project? Do the necessary capabilities exist to complete it? Are applications packages obtainable for use on the internal DP system? If not, can the DP staff provide the development resources required for the project?

Two-Sided Argument

Following are some good reasons for staying in, and some equally compelling reasons for farming the job out.

By staying within, the user stands to place himself on the black side of the

bottom line. Internal costs are frequently "extremely attractive" and become even more so if the DP cost is absorbed in overhead or administrative budget.

On a more personal and less tangible note, taking a project outside may ruffle the feathers of DP personnel who will be called on to perform other jobs in the future.

On the flip side, an outside service can provide secrecy. With the exception of immediate management, the user may not want anybody to know a sensitive, experimental project is being worked on until it is successfully completed.

"In many cases, these are one-time

projects," the survey noted. "With them, you are able to justify your approach using an outside service based on the fact that you are only testing an idea. It is just an experiment, that's why you don't want to interrupt the in-house organization."

Remote computing also provides a great deal of flexibility. If something goes wrong, the outside service is obligated to fix it. An internal organization may be less willing.

The survey, entitled "A Guide to Planning, Selecting & Managing Remote Computer Services," is available for \$395 from Newton-Evans Research Co., 10318 Globe Court, Ellicott City, Md. 21043.

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While Boosting CPU Accessibility University Cuts Costs to \$1.60/Terminal Hour

Special to CW
AMES, Iowa — Inflation, a limited budget and an increasing demand for computer services just don't mix. But Iowa State University here has found a way around the infla-

tion crunch. It is using mini-computers, microcomputers and a National Advanced Systems Corp. AS/6 mainframe to boost student access to the school's computer system, while cutting computer costs

to \$1.60 per terminal hour.

Prior to 1978, the school's computation center relied heavily on its AS/6 for campuswide computing services.

"Accessibility to computing was a problem. There was a real need to extend interactive access to wider segments of the academic population. But budget constraints would not allow outright replacement of our mainframe with larger machines," according to Dr. Clair G. Maple, director of the computation center.

Computer Growth

To satisfy the growing demand for computer services, the school developed a five-year plan that involved buying two Digital Equipment Corp. VAX-11/780 and 48 PDP-11 minicomputers.

The goal was to increase the number of available terminals and make them more accessible for students. Starting out with 64 terminals in 1978,

Iowa State now has 72 and hopes to have 104 installed by the end of the year.

Terminals were installed in convenient locations, such as special rooms, dormitories and in academic departments.

Budgetary Constraints

Since its systems budget was in the neighborhood of \$2.5 million a year, the school could not afford a full-blown reassessment of its computer system. Iowa State wanted to develop a campuswide network that would match computing capabilities to an individual student's requirements on a job-by-job basis. This network, the school hoped, would connect users automatically and transparently to the appropriate processors for their particular jobs. This would minimize wasteful overhead and idle computer capacity. But it also required a range of computers that would match almost any job.

To meet this goal, the school's computation center developed a five-year plan for putting its various computer systems into use.

The plan called for the AS/6

to be enlarged to handle repetitive batch jobs. For short, interactive time-shared tasks, the VAX-11/780s were used. And for real time, measurement and control applications, such as teaching and research done in laboratories, the PDP-11s were used, Maple said.

To help implement the program, Iowa State received a \$243,000 National Science Foundation grant, Maple added.

The usage cost of the network was calculated by dividing total hardware and software costs, including support personnel and maintenance costs, by the number of hours the terminals were used. The result was a surprisingly low \$1.60 per terminal hour.

The result of Iowa State's computer strategy has been an increasing involvement of students in computing activity for a manageable expenditure. Most Iowa State students now use computers. Users of the VAX systems have reached more than 38,000 terminal sessions in a peak month, with sessions averaging more than 40 minutes each.



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Eight-Step Plan Outlined

(Continued from SR/14)
benchmark programs.

- Running the benchmark programs under varied conditions.
- Preparing the report and recommendations.

Benchmark size and complexity should be relevant to the user's needs, the report emphasized. Generalized benchmarks are often unsatis-

factory and can yield results which can be misleading insofar as they may or may not pertain to the particular applications environment and project.

Last, step eight calls for negotiation of the contract. Remote computing service contracts are often let on two levels, the study noted. The first is the organizationwide or master contract. These may be prepared for a few "preferred" vendors.

The prospective user should be sure to become cognizant of the existence of any such master agreements within the organization prior to negotiating what could be a separate, redundant or even less favorable contract, Newton-Evans said.

The administrator (and policy guide) should be of assistance in determining the existence of any master contracts.

If the user is seeking to negotiate a project-oriented contract for his specific needs that is outside the scope of any existing remote service contract or which may be negotiated with a vendor with whom no agreement is currently in effect, he needs to work with the service's administrator, legal counsel and possibly a contracts analyst, the study said.

The study, entitled *A Guide to Planning, Selecting & Managing Remote Computing Services*, is available from the Newton-Evans Research Co., 10318 Globe Court, Ellicott City, Md. 21043.

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Small Businesspeople Guided on First

By Tom Henkel

CW Staff

NEW YORK — The small businessperson buying his first computer system is often baffled over exactly what kind of system will best suit his company's needs.

While Arthur Young & Co. recommended potential users seek the advice of computer specialists before buying a computer system, the firm offered some preliminary steps businessmen can take before actively getting into the computer market.

The first step is simple, but important. The potential user must first take a good hard look at how his company works. How inventory is planned, controlled, identified and costed; how and when customers are invoiced; how and when bills are paid; how costs are figured; how shipments are made; and how production is handled are all important factors that could influence a company's decision on a particular system, the firm said.

Need for Computer

Once the company has determined exactly how it does business, it's time to figure out whether a computer — in the case of a small company, probably a minicomputer — is really what the firm needs. The prospective buyer should make a list of what reports he wants from his system, how often he wants them and what information should be included in the reports.

Another factor that should be considered is what type of format the reports should take. Will they list information by product, salesman, territory or document number? And how will special information be handled?

How data will be entered into the system is also an important consideration. While many prospective users are convinced computerization is a panacea for all their problems, they often fail to realize buying a minicomputer may mean some drastic changes in the way the firm operates.

For example, inventory items may have to be identified by a six-character code in which the first three characters are

letters describing the product and the second three are numbers that indicate the size. While some firms may already employ a similar inventory code, some firms may have to revamp their entire operation.

Documentation Factor

Firms should also consider what kinds of documents they want a computer system to produce. How many copies of each document and what in-

formation should be on each are also factors, Arthur Young said.

How a firm keeps its books is another important factor. The company's flow of accounting information from the system to the general ledger has to be determined. Once completed, the firm can decide what entries are to be made, when and from what source. It must also decide how that procedure can be

audited by leaving a series of checks, or audit trails, to verify the accuracy of entered data.

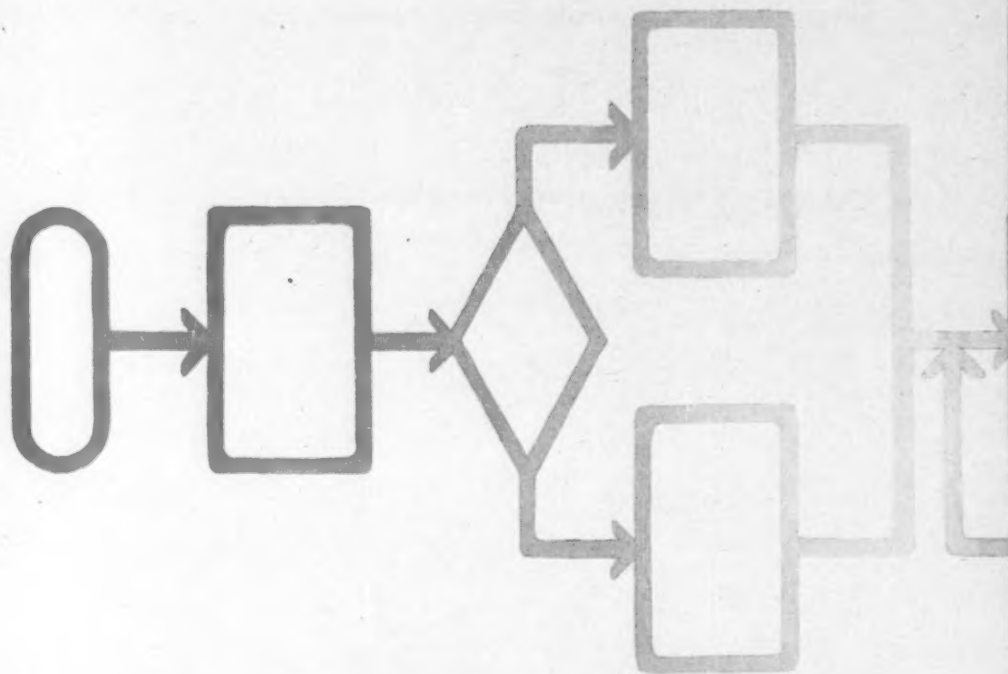
Potential users must also figure out whether they want to be able to ask their computer questions, or whether they just want it to perform predefined tasks. If inquiry is desired, which would usually be done through a terminal, the user must decide how often inquiries are to be made and

what information will be available to what employees, according to Arthur Young.

Once all those decisions have been made, the prospective user should have a good idea of the type of system he wants, how much it will cost and which vendors are offering acceptable systems.

Hard Part

Then comes the hard part — narrowing down the hardware



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vendors to the best system and choosing software.

"It is almost impossible for a businessman to make a comprehensive technical evaluation of a minicomputer," Arthur Young said. However the firm added some things such as literature from private analysis firms such as Auerbach Publishers, Inc. and Datapro Research Corp. often supply an unbiased report on the technical aspects of various

systems.

"It is possible to develop a minicomputer system using the equipment from more than one vendor. For example, it is possible to have a system where the CPU, CRT terminals, printers controllers and mass storage units are all manufactured by different companies.

"Such systems are most often designed by engineering-oriented firms. The advantage

of missing components is that it enables you to obtain features which might not be available in a given price range from one manufacturer," the report noted.

However, the firm warned prospective customers to check with manufacturers to see who will be responsible for checking and diagnosing problems in a multivendor installation.

Finding the right software

may be the hardest decision for novice users. There are many vendors offering packages that look alike, but may not offer the same performance. Making a value judgment is further complicated by the fact that, unlike hardware, software packages can't be as clearly compared with each other. Some offer features that others lack.

"If you find a package which fits your system needs and

your price range — take it," advised Arthur Young. However the firm warned few companies find a software package that perfectly fits their needs.

"A great deal of work will still be required even if [the software] fits exactly, but you will have a much better chance than if you design your own system," the firm said.

Make sure the software fits your needs by asking to see it in operation without a salesman. And determine what level of expertise is needed to operate and control the software.

"Beware of [software] which needs only 'a few minor changes.' If they are really minor, suggest they be made on a working system so you can see them in operation," according to Arthur Young.

It is doubtful that the novice user will find a package that exactly fits his needs. Specialized packages are available for specific applications, but most are designed as general packages to meet the needs of diverse types of businesses, the firm noted.

Package Limitations

Many packages can be tailored to meet a company's specific needs, but users should beware of a package's limitations.

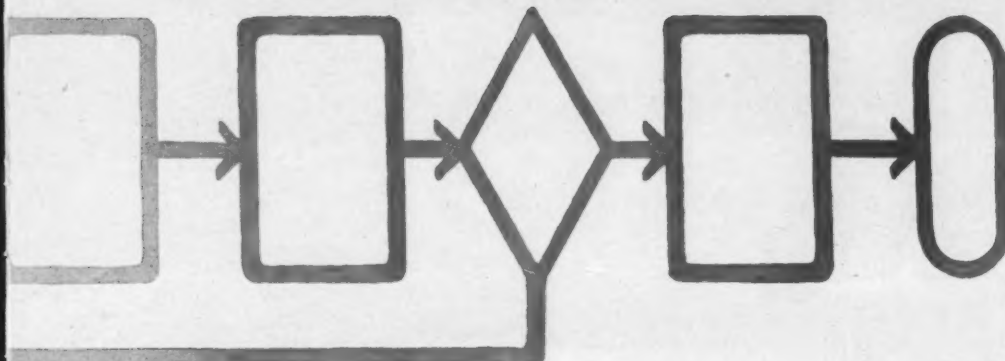
"It is not advisable to accommodate exceptions which have a direct impact on accounting information, but exceptions impacting management information can be worked around," Arthur Young said.

An example of this philosophy is a hypothetical package that can only associate one salesman with an invoice. Occasionally two salesmen make one sale. This can be circumvented by identifying the two salesmen as one, i.e., Jones-Smith, the firm said. That would be an acceptable modification.

An unacceptable package would be one where a hypothetical user occasionally adds a 15% surcharge to an invoice if the customer has not purchased a sufficient volume in the past month. If the package could not handle that change, it may present a problem because it would require a clerk to manually type in the surcharge — a process that could introduce errors into the system, the firm noted.

If a user can't find software to meet his needs, he has another option. He can prepare a request for proposal and send it to selected vendors and turnkey systems houses asking what they have to meet the user's specific needs and how much it will cost, the firm noted.

The Arthur Young & Co. report is available from 277 Park Ave., New York, N.Y. 10017.



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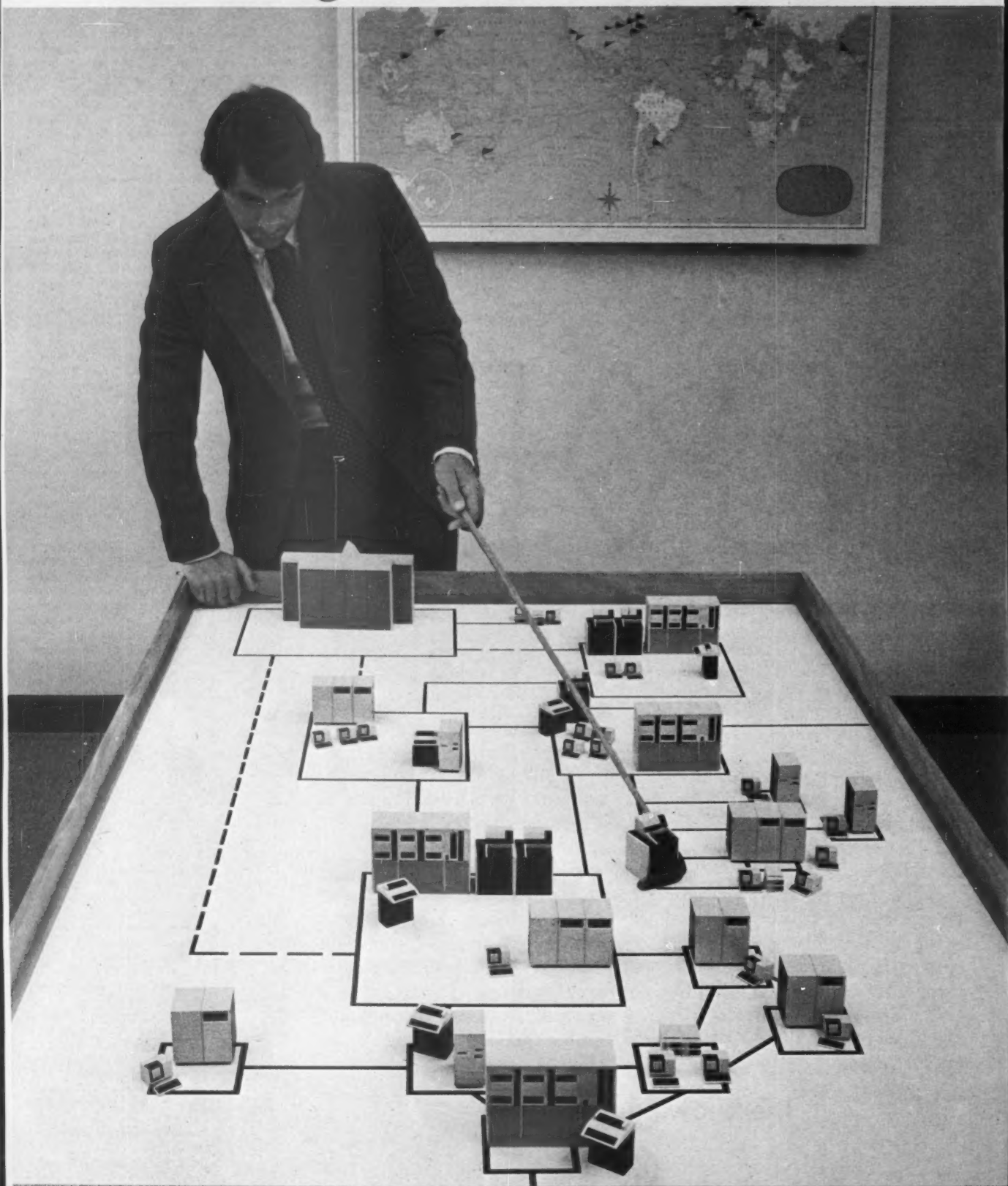
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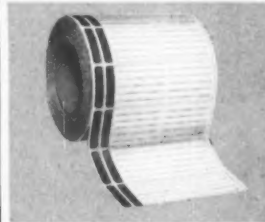
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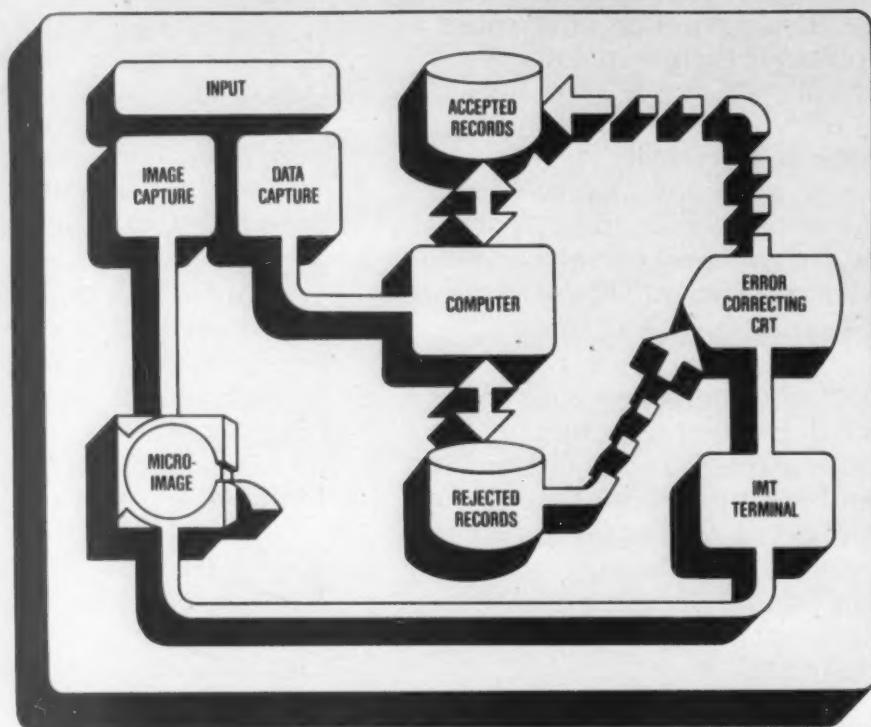
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CPU, Micrographics a Synergistic Blend That Stretches Dollars, Avoids Overkill



With a microimage terminal linked to the data correction displayed on the data terminal. At the same time, the image of the document is displayed on the microimage terminal.

By Dennis Neary

Special to CW

ROCHESTER, N.Y. — The idea that more is better is not always true — especially when it comes to buying bigger, faster and more expensive CPUs. Often higher capacity CPUs create a sort of DP overkill, where the user winds up with computing power far beyond his projected needs.

An alternative to adding CPU horse power is to take advantage of interfacing technology to improve those functions that are not accomplished efficiently by computers. Data storage on microfilm is one example.

The CPU captures and processes data very efficiently, but it cannot handle images as efficiently because storage costs are too high. Microfilm, on the other hand, is a very efficient and cost-effective way to store images, but retrieval from a magnetic file is faster than from a film file.

The idea is to blend the two technologies and use each to its best advantage. When the CPU and micrographics are interfaced, the result is synergistic.

Cost Comparison

Consider the cost comparison for data storage between disk and micrographics, for example. It is about 1,000 times cheaper to store images on microfilm than it is on disk. A 300M-byte disk pack, such as is used on an IBM 3350 disk drive, costs about \$2,000 and will store the images of about 2,500 letter-size documents. That's a cost of about 80 cents per document just for the medium on which it is stored.

At a photographic reduction of 50:1, the images of 25,000 letter-size docu-

ments can be stored on one roll of 16mm microfilm. That costs about \$20, or 10 times the capacity at 1/100 the cost. So, the cost of micrographic media to store one document image works out to about 8/100 of a cent, or about 1/1,000 the cost of disk storage.

There are trade-offs, however. Even at the high cost, an advantage of storing images magnetically is they already are in bit form and can be immediately sent by wire to a remote CRT terminal. The microimage has to be converted to bit form, but micrographics is catching up here, too.

Microfacsimile equipment that is ca-

pable of scanning and digitizing microimages for electronic transmission is now becoming available. In the next few years, it will become common for images to be retrieved from a microfilm file, scanned by a microfacsimile machine and transmitted like data. The terminal at the other end will recreate it on a CRT terminal, print it on paper as a full-size document, or on film as a duplicate microform.

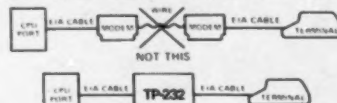
Computer-Assisted Retrieval

Today, DP managers can take advantage of the synergism provided by in-

(Continued on SR/26)

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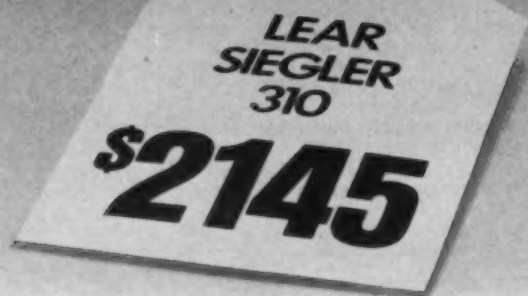
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Space/Blank Compression	Yes	No
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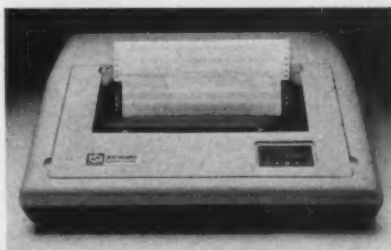
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CPU, Micrographics a Synergistic Blend

(Continued from SR/24)

terfacing the two technologies by letting the computer help the microfilm equipment retrieve the image with computer-assisted retrieval (CAR).

The idea with CAR is to capture data magnetically and images micrographically. Many data-capture devices on the market now are equipped with microfilm cameras to do this.

The data file in the computer then contains summary information about the document, and it also lists a microfilm roll and frame number address (or pointer) for the document image.

For the 80% of retrievals that can be satisfied with summary data, only a computer terminal is used — taking advantage of the speed of the CPU. For the remaining 20%, for which more complete data is needed, both the computer terminal and the micrographic terminal are used.

With an intelligent terminal, attached on-line to the CPU, retrieval time is shortened substantially. The operator only has to insert the proper roll of microfilm as instructed by the computer terminal, and let the CPU drive the film to the proper image.

Two Factors

The extra speed of microfilm retrieval comes from two factors. One is that the CPU automatically presorts the required retrievals into the order in which the documents appear on the microfilm. The other is the operator addresses only the computer terminal, instead of operating both terminals.

There is no need to key index numbers or codes into the microimage terminal because the computer already knows what they should be and automatically downloads them into the microimage terminal.

If several retrievals are to be made from the same roll of microfilm, the operator simply puts that roll into the terminal and touches an "advance" key on the computer terminal to go on to the next document. The image then appears automatically on the micrographic terminal screen.

Recent advancements in microfilm coding make retrieval even more efficient. Intelligent microfilmers can be programmed to expose up to three different-sized image marks on the edge of the film beneath each document image. The difference in sizes of these marks effectively divides the file into block, batch and item sequence at the time of microfilming — more closely matching the indexing of the computer file.

Reject Reentry

The flowchart in the figure is descriptive of blending of computer and micrographic technology to improve suspense file reject reentry. In this case, digital records rejected by the CPU are displayed on the data terminal. The operator has previously selected the proper rolls of microfilm from the file, and inserts them into the microimage terminal in order.

As the data is displayed on the CRT, the image of the document that generated that error is displayed on the screen of the microimage terminal. Displaying both images simultaneously significantly improved the productivity of the operator, who no longer has to key any code into the microimage terminal.

This same reject reentry method is

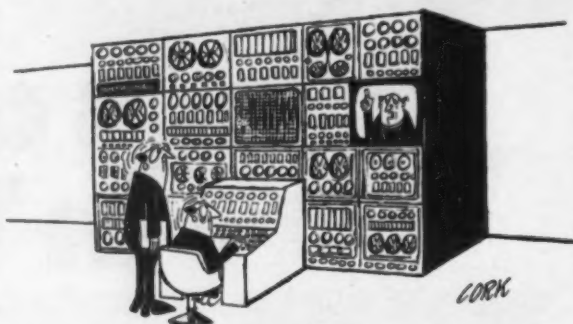
part of an automated system that is saving significant amounts of time for a service bureau that processes more than 200,000 health insurance claims daily. The earlier system involved examiners looking at each claim upon receipt, then making decisions as to its validity. They then checked boxes on a form telling the computer whether to pay the claim, reject it, or issue a turn-around document requesting clarification from the provider.

Under the automated system, a CPU makes most of its decisions by checking the claims against 200 different evaluation criteria. For claims such as for drugs, 70% are handled in the computer, which generates a magnetic tape for payment, rejects the claims, or asks the provider for additional information.

The other 30% are suspended in the CPU because some human judgment is needed. Data may have been captured incorrectly; it may have been entered in the wrong place on the form; or some other problem may exist. Only these exceptions are kicked out for human examination.

Instead of trying to recover data from the million-or-more pieces of paper received daily, the examiners can refer to the document images in a microfilm file. When the claims are received each day, they are given only cursory sorting. During microfilming, they are assigned roll, batch and claim numbers, and this address is part of the data entered in the computer.

Neary is an industrial engineer for Eastman Kodak Co., in Rochester, N.Y.



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Their four Level 6 Systems give Reserve Fund all the flexibility and back-up they need. Information flows easily.

For example, terminals are used to enter purchase orders and to provide quick answers to customer inquiries.

At the same time, the system is also maintaining an on-going record of all transactions.

As you'd expect, security is a great concern. But thanks to features built into TPS-6, Reserve Fund has developed effective safeguards.

Every operator has an ID number, a password, and a specific security clearance. Access is carefully regulated.

As a further precaution, the system has a built-in time-out feature that automatically clears the screen after a specified period.

Thanks to capabilities like screen data formatting and multiple key access to files, Reserve Fund has been able to tailor a system that's both effective and efficient.

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For more information, write Honeywell, 200 Smith Street (MS 487), Waltham, MA 02154.

Honeywell

Lab System Revives Clinic's Billing Activity

LYNCHBURG, Va. — The clinical laboratory at Virginia Baptist Hospital here is reportedly saving \$60,000 yearly in automated billing expenses and realizing a 119% productivity increase through the use of IBM's Laboratory Data Management System (LDMS).

Virginia Baptist's experience with LDMS shows that small and medium-size facilities can benefit from computer-assist-

ed lab systems previously found only in larger hospitals.

Each year, Virginia Baptist admits 12,000 patients, who are cared for by some 125 doctors. As physicians have come to rely more heavily on laboratory data for patient diagnosis and treatment, laboratory test volume at the hospital has increased an average 20% a year over the past five years. Last year alone, the laboratory performed over 730,000 tests.

As the test volume grew, so did the clerical work load. Errors inherent in a manual reporting system began to increase, problems with accountability arose and responses to inquiries slowed. Clearly, the laboratory needed a better method for handling all this data — and LDMS looked like a promising solution.

The system helps manage lab data for all tests performed

from the time a patient enters the hospital until the patient is discharged. Test orders and results for major laboratory sections may be entered on-line through CRT terminals. Lab sections supported include blood bank, microbiology, serology, chemistry, hematology and urinalysis.

Entries for orders and results are made either by menu selection from a display screen or by keyboard. To enter orders

on the screen, a terminal operator touches a light pen to desired test names and assigns a status (Routine, Today or Stat) to each test. On completion of an order entry session, the system displays a summary screen listing all tests that have been ordered for final review by the operator.

Specially formatted screens for various test types help speed result entry and reduce errors. Operators simply fill in the blanks on each screen by keyboard entry.

Terminal Distribution

The laboratory organizes these on-line operations around four display terminals — one in the central receiving area, used primarily for order entry; one each in hematology and chemistry, used mainly for result entry; and one at the lab secretary's desk for responding to inquiries about test results.

As soon as an order is entered, LDMS records a charge for the procedure. This automated billing feature has produced an unexpected and welcome increase in laboratory revenues. Although part of the additional revenue is the result of increased test volume, more can be attributed to recovery of charges that previously were lost.

Gene Davis, chief medical technologist at Virginia Baptist, estimates that automated billing is recovering \$60,000 a year in charges that were lost under the manual system. "We've more than offset the cost of the system," he said. "By the most conservative estimate, we've saved thousands of dollars more than the system has cost us."

Productivity Up

Not only is the system generating additional revenues, it is also proving cost-effective in terms of improved productivity and better utilization of laboratory personnel.

"Our productivity has increased considerably since we installed LDMS," observed Davis. "Using the work load recording system of the College of American Pathologists, we've set a target of 55 productive minutes per hour of work. With this system, we've gotten as high as 119% of that, better than 60 productive minutes per hour."

The system has also enabled the laboratory to absorb a bigger work load without a corresponding increase in personnel. Since 1976, the year before LDMS was installed, the laboratory has absorbed a 30% increase in test volume with three additional employees.

With LDMS, filing, storage and retrieval of test results is an automatic by-product of daily system usage.

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Five Generations of Computer Use Subscription Service Finds IBM 3032 Delivers

Special to CW
WESTWOOD, Mass — A periodicals subscription agency here has increased its productivity and improved throughput by switching from an IBM 370/158 to a 3032.

The product the firm handles is serial publications — and its files contain listings of some 110,000 magazines, newspapers, journals, periodicals, proceedings and yearbooks published in 140 countries.

The customers are libraries — 20,000 of them: university and school libraries, public libraries, medical, corporate and special libraries throughout the U.S. and worldwide. Delivering many of those products to the customer is the F.W. Faxon Co. — a 99-year-old firm that continually updates, refines and expands the subscription service it has been providing libraries for more than 60 years.

Why a subscription agency? You have to think big. A university library administrator can be faced with the need to acquire some 30,000 serial publications annually, a potentially overwhelming procedure. It requires effective selection, efficient ordering for uninterrupted delivery, prompt claims for missing issues and a comprehensive budgeting and payment system. Faxon — claiming to be the only independent subscription agency in the world that devotes its entire effort to library accounts — expedites all of these functions on an IBM 3032.

Five Generations

Albert H. Davis Jr., chairman and chief executive officer of Faxon, introduced automation to the library periodicals subscription field more than 20 years ago. Beginning with a 305 Ramac in 1958, five subsequent generations of IBM computers with increased capacities have brought the company to its recent selection and installation of the 3032.

"We have so many CRTs on-line — nearly 200 — that we needed a faster response time," Richard R. Rowe, Faxon president, explained, "and that's what we're getting with the 3032. This will enable us to increase our service substantially, especially as we go into direct on-line services with libraries."

"We can process about 2-1/2 times our former volume," added N. Bernard Basch, the company's vice-president for operations. "On the 370/158, we were handling about 65,000 transactions per day — 1.3 million a month. Reducing the time it takes for a transaction has increased our throughput."

"And our requirements are such that we know we will need more terminals; we're adding terminals at the rate of 10 to 20 a year," he added.

Gratification Factor

The CRT terminals are important for the staff, too, said Basch. "I think there's a psychological factor. People seem to be more enthusiastic about

the work they're doing — probably because they're able to address a problem, take an action, and get something done. They don't have to put it down and pick it up again later."

With the move to the 3032, the company has upgraded operating systems from DOS/V5 to MVS. "This allows us to do practically everything

we want to do," Albert Davis explained. "The service departments always must have their necessary portion of the operating system. Because of seasonal variations in the work load, this occasionally meant that other key departments had restricted time."

"But now, with our increased capacity, we can channel the work flow according to

the priorities we want to appropriate — not according to the variations in the work load," he said.

F.W. Faxon maintains a large application staff, but depends on IBM's software systems. In Basch's assessment, "the overall reliability and service of the system have been excellent." The system is in 24-hour operation five days a week.

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Jim Cron, Vice President, Peripheral Systems Marketing

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patibility problems. It is totally compatible with all IBM 3330/3350 disks and controllers. Our Storage Controller lets you intermix 100MB, 200MB, 317.5MB, 400MB, 635MB — even Mass Storage all on the same unit."

"Besides technical considerations, there are many other reasons that make the 33502 a better business decision. Control Data's reputation is for reliability, service support and broad product experience. And there are more reasons. For the full story contact your local representative, or call 612/553-4158."

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October 23-24 (English Language)
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Deere Uses Third-Party Programs Tailored to In-House Training

By Dan Himes

Special to CW

MOLINE, Ill. — Computers and the software to manage them are a major investment for most companies. But the people who run the computers represent a major investment, too. And keeping them trained and productive can prove one of the biggest cost-saving measures a company can take.

Deere & Co., makers of John Deere tractors and other farm machinery, has found third-party training courses, similar to those offered by such firms as Advanced Systems, Inc. and Deltack Corp., offer a better training program than Deere could ever muster, at a far lower cost.

An IBM OS/MVS shop, running 10 3033 CPUs at two

DP centers here and in Waterloo, Iowa, Deere takes vendor-produced training courses and tailors them to its own environment.

By using prepared training programs implemented through video-assisted methods, the firm can train personnel in several locations at one time. In addition, since everyone receives the same training program, the company is assured training is consistent.

Deere holds its regular classroom training sessions at the company headquarters here. In 1979, more than 7,000 student-days of training were completed at that site.

Course leaders are not professional instructors, but on-the-job company people acting as advisory instructors using the video and course materials as necessary. Supplementary course material is modified to meet the firm's specific needs. And video tapes are used to support those modifications.

Average courses cost about \$65 per student including course rental, a three-person full-time coordinating staff, the computer time, material and advisers.

On-Site Training

Some training also occurs outside the Moline classroom. For noncorporate locations such as factories and marketing locations, Deere publishes a catalog of available courses. Deere has developed recommendations of what courses should be completed by specific job titles. In addition, advisers from corporate headquarters talk with employee supervisors to determine what new courses are needed to meet specific training needs.

Deere uses more than 250 training tapes each month from Advanced Systems in addition to courses from other vendors.

So far, Deere is pleased with the quality of courses it has received from professional training firms. Courses are shipped on time and the vendor's personnel are usually on hand to iron out any problems.

As far as results go, the firm is pleased. It has been using video-assisted training since 1970, and top company brass feel they have succeeded in developing a systems staff that has been trained specifically for the Deere environment. In addition, the courses keep already trained personnel up on current trends in the information processing business, and helps them make the best of Deere's resources.

Himes is systems education administrator at Deere's home office in Moline.

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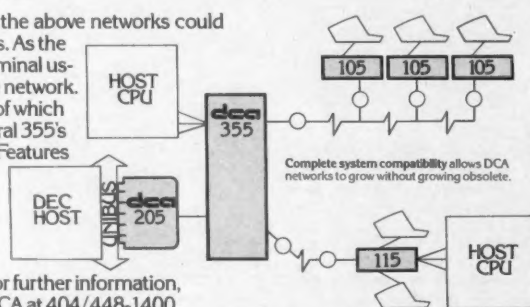
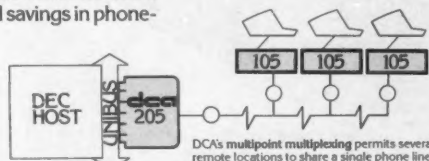
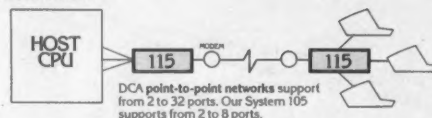
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Drops Service Bureau Housing Office Finds Savings Under Own Roof

KNOXVILLE, Tenn. — The housing and redevelopment authority here is saving \$40,000 yearly after dropping a service bureau in favor of a minicomputer-based public housing system.

The Knoxville Community Development Corp. (KCDC) is the beneficiary of the system. It is using it to track the individual costs of operating 18 public housing developments.

The need for individual monitoring of costs was brought about by the U.S. Department of Housing and Urban Development (HUD) in late 1978 when it unveiled the Project Based Budgeting (PBB) demonstration project as part of its Public Housing Urban Initiatives Program (PHUIP).

A major objective of PBB is to provide a vehicle for planning and monitoring income and expense on a project-by-project basis, involving input from project-level management and responsible resident groups as well. The end result is a management tool for improving authoritywide administration and for reinforcing the decentralized management concept.

Presently, because of inadequate financial feedback, there are limited incentives for either project-level staff or KCDC's 12,000 residents to be cost conscious, according to a KCDC spokesman. While the consolidated method of planning and tracking required by HUD is a valuable tool in determining overall performance, it does not measure the financial impact of project-level maintenance, management, and resident support; nor are overhead income and expenses adequately shared, he said.

The sophisticated system needed to accomplish the various elements of PBB and the demands of modern public management in general led to the acquisition of an in-house, interactive minicomputer system.

It was deemed to be the most acceptable solution to KCDC's administrative dilemma.

Service Bureau Drawbacks

Currently, KCDC utilizes dated financial application software run at a local service bureau. This method of operation has significant drawbacks although it was warmly welcomed when it was introduced about 10 years ago.

First, the general ledger system is consolidated according to HUD's reporting requirements; thus, the software cannot be revised without incurring substantial additional expense with only minimal return.

Second, payroll, tenant accounting and fixed assets were the only other functions that had been successfully developed and applied to KCDC's environment.

Furthermore, all systems are essentially stand-alone systems which do not interface with the general ledger system.

Most importantly, the use of the service bureau prevented the generation of information on a timely basis — an absolutely essential need for a decentralized operating environment and PBB.

Additionally, the method of operation and the systems design did not employ the latest advances in hardware or systems technology.

In choosing an affordable system with the necessary capabilities to carry KCDC through the demands of the '80s, KCDC selected Kent Watkins and Associates, a Washington, D.C.-based management consulting firm. Currently, 19 housing authorities with varying geographic locations, sizes and needs have been introduced to its turnkey minicomputer-based public housing system.

The hardware selected and currently in use consists of a Mini Computer Systems, Inc. (MCS) Micos 200 with extended memory (128 K bytes), a decimal arithmetic board for enhanced throughput, dual 80 M-byte disk drives, a 600 line/min. printer, and

seven CRT terminals.

Within the next few months, KCDC will discontinue use of the service bureau in favor of the in-house PBB general ledger system, the spokesman said.

Besides this system, other applications include tenant accounting and reporting, Section 8 accounting and reporting, Section 23 accounting and reporting, homeownership accounting and reporting, resident application and selection and warehouse inventory, among others.

All subsystems interface with each other and employ an integrated data base and are programmed in Micos' Extensive Basic. Most of the subsys-

tems are operational or in their final parallel testing mode. The conversion and start-up process has gone well since it was initiated last March and KCDC is several months ahead of its schedule, according to the spokesman.

The provision of timely, accurate financial data is a vital element in KCDC's overall management strategy, according to Richard T. Dulaney, KCDC's finance and administration director. "With our new in-house system, we finally have the ability to budget, control, and report detailed accounting and cost center allocations on a project-by-project basis without sacrificing the essential agencywide consolidated reporting system," he said.

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Savings of \$1,000/mo System Gets Auto Parts in Gear

ANAHEIM, Calif. — Computerizing management and sales order processing functions is saving American Brake Supply (ABS) almost \$1,000 a month, half a person in the warehouse, valuable management time and untold dollars from accurate pricing.

However, more benefits of computerization are still to be realized, according to Steve Jones, general manager of this 15-year-old, million-dollar-a-year business here.

'The company can tune its parts supply to items that are popular and move well, rather than rely on impressions or annual inventories.'

In April Jones installed a Pertec Computer Corp. PCC 2000 small business system running applications programs designed specifically for the auto parts market.

Gene Watkins, owner of Pacific Microsystems of Laguna Hills, Calif., one of 100 authorized small computer dealers for Pertec, developed the modular software for parts distribution firms.

Watkins, who calls the system Parts Inventory Management System (Pims), is customizing each module prior to releasing it to ABS. Currently, he said, the auto parts distributor is running the inventory management and sales order processing modules with a high degree of success.

"Our 30,000-item inventory of brake components, shock absorbers and front-end chassis parts is totally on the PCC 2000, our first computer," Jones said. "Once Pims was up and running, following the month it took to list all current inventory, we noticed an immediate improvement in customer service."

Jones feels that the better information now available through computerization nets ABS about \$1,000 a month, "an amount equal to a new account." This better level of information relates to a reduction in lost sales because the company can tune its parts supply to items that are popular and move well, rather than rely on impressions or annual inventories.

Additionally, Jones said pricing errors, which he estimated cost untold sums of money, have been almost eliminated and shipments with the correct quantity increased.

Half Person Saved

"Price/quantity checks take place immediately for back office personnel when phone orders are taken and for the counter staff who deal with walk-in customers," he said. "The half person we've saved is me because I spent part of my day tracking down quantities and/or prices rather than running the business."

"As a consequence, our operations are now a lot smoother and I have more time for customer service and new business development."

Jones receives inventory and stock order reports on demand as well as sales and pricing information by item. Financial reports of sales and returns, cash and charge accounts — including average costs and gross profits — are

prepared daily, monthly and annually.

Pims also assists ABS by totaling and printing the invoice along with any discount each customer is entitled to, according to Watkins. After Jones or another member of his staff has checked price and quantity, the inquiry can be converted to a sale without reentry of data.

Pims was designed to allow high speed data entry of up to 500 part numbers at a time, a feature that Jones used when the system was installed earlier this year. Presetting of common part number prefixes avoided repetitive entry requirements and allowed backing up to previous entries.

"Ease-of-use features such as the inventory prefix and an extensive selection of menus and prompts let us add 4,000 part numbers and almost 30,000 parts to the system in a month," he said. "It took less than eight hours to learn how to use the PCC 2000 using instruction manuals and the guides within Watkins' software."

Through passwords, Jones' staff can use the Sysgen module to update customer names, passwords, sales tax rates, taxes on labor, sales taxes on parts, markups to list prices and definition of names for ten cash-paid-out categories.

System Expansion

Eventually, as ABS' inventory and customer lists grow, more flexible disk drives can be added which would dou-

ble the data capacity of the PCC 2000; or, through a series of hard disk enhancements, mass storage can be increased to 80M bytes.

The priority list of Pims module additions beyond inventory management and sales order processing includes brake cores processing, accounts receivable and payable and general ledger. All are integrated with each other under the system's software.

Pims operates under Pertec's Multi-Terminal Operating System (MTX) which, in addition to the 80M bytes of hard disk, can also operate up to four separate I/O terminals.

"We selected the PCC 2000 and Pims because of their ease of installation and use, the modular approach to software and, most importantly, the availability of hardware and software support," Jones stated. "If we had selected a competing system of similar capabilities, we would have had to knock out a wall and set up a special room full of elaborate air conditioning equipment to keep the computer cool."

The PCC 2000 consists of the CPU, CRT screen, detachable keyboard and dual flexible disk drives in one unit. A separate station printer stands alongside the desktop system.

According to Watkins, Pims can be applied to almost any inventory and sales order processing situation involving automotive parts, electrical distributors, electronics suppliers, tire centers and hardware stores.

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DBMS Lets Bank Save Money and Cut Waste

LOS ANGELES — United California Bank (UCB) here is doing one of the things banks do best — saving money. The firm says it will save an estimated \$3 million over the next five years thanks to a recently installed integrated data base management system (DBMS) in its Work Measurement Department.

The department has 11 people and is responsible for developing and maintaining staffing and costing standards for UCB and its 308 California branches. Every operation performed by 5,000 of the more than 12,000 bank employees is scrutinized here to help reduce time and money spent on unnecessary and repetitive work.

The average job or standard performed by an employee involves as many as 10 tasks and each task requires between 10 and 15 elements or motions. Thus, hundreds of individual motions — everything from picking up a pencil to rolling a piece of paper into typewriter — may be involved in a single job.

By measuring such tasks in minute detail, the UCB Work Measurement Department has reportedly saved the bank countless dollars in operating waste within the past seven years, bank officials said.

Manual System Inefficient

Three years ago, UCB had about 400 standards broken down into time measurement units of .036 seconds each. The standards were constantly under review, manually updated and filed in large cabinets.

However, as the UCB Work Measurement Department began to develop new areas for measurement, it realized it could easily develop well more than 2,000 standards, or more specifically, become responsible for studying more than 20,000 tasks. Keeping manual records on this amount of information now became impossible.

"If someone wanted to know how much time was spent in our branches for microfilming items, we had to go through thousands of task files manually to determine which ones were included in the microfilming work and compute the totals of each task," Carl Jensen, manager of Work Measurement Support for UCB, explained.

"It got to the point where the manual work for producing reports was making our response time so slow that the reports were often worthless by the time they were completed. Other reports required so much work to produce they were impossible to do. Even those reports which were finished in time to be useful were subject to massive human error.

"We knew we needed something other than a manual system, and we thought computerization would help. More specifically, we thought a data base system could be the answer to their problems. I was hired to find the solution."

Feasibility Study

Jensen's first job was to perform a feasibility study to determine whether a data base could help UCB with its time measurement program and, if so, whether a commercial system was available to put the manual system on the computer.

"First, I contacted several of the

largest banks, insurance companies, financial institutions and even work measurement associations to see if any of them had a program similar to what we were looking for," Jensen said.

"We wanted to avoid reinventing the wheel if we could. But we couldn't find a system to interrelate tasks and elements within standards. The closest thing I could equate to our needs was a bill-of-materials system used by manufacturers to keep track of the many parts and steps in manufacturing an item. But we also needed a system which could perform modeling to help us plan for change and produce ad hoc reports," he said.

"Our next step was to write a description of our current work measurement system and list our criteria for

computerizing the work. We sent this information to some 20 DBMS vendors with systems which could run on our dual IBM 370/168s. We asked for bids and received five responses."

Asked what criteria were important, Jensen said, "User language facilities became a major criteria because none of the people in our department have any DP training. Ease of use was absolutely critical to the success of computerizing the department.

"The system also had to be extremely flexible to accommodate the constantly changing environment in a bank. And no matter how good the front-end data base system we bought would be, we knew we'd need a lot of initial support. As far as we could tell, no one had ever

tried this kind of application before so the data base vendor had to be willing to create a brand new system," Jensen added. NCB decided to buy Infodata Systems', Inc. Inquire. "The other vendors were not willing to commit enough time to help us get our system up and running properly and were not able to give us concrete costs either. Infodata came in with a maximum figure for implementing the system and gave us an extremely accurate estimate of how much time would be needed to complete the job," Jensen said.

"We estimated that with the initial purchase price of less than \$85,000, we could reduce standard development time in our department by 25% because analysts would not be doing manual calculations," Jensen noted.

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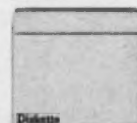
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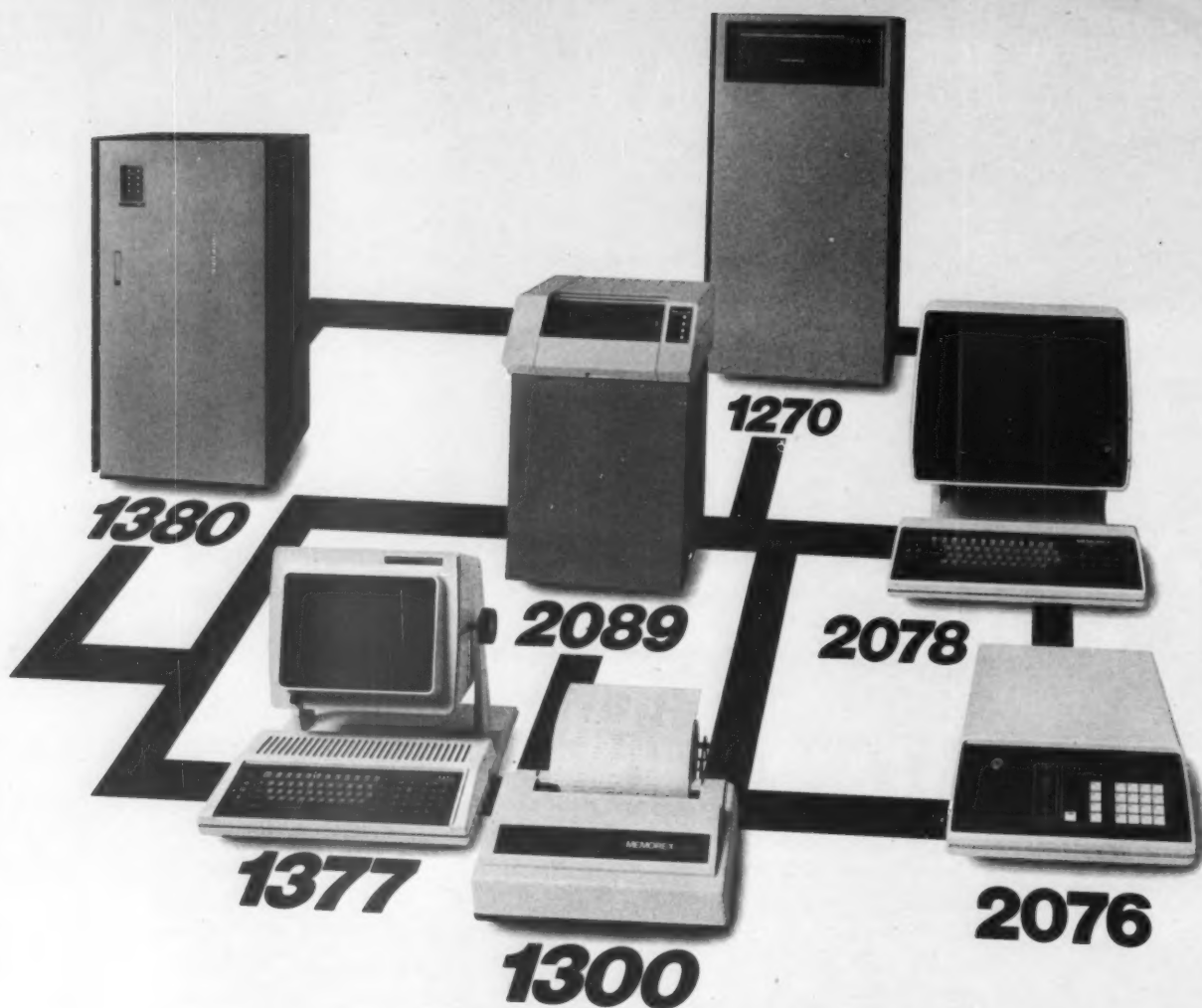


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Picks Dual-Mini System

R.I. DOT Moves From Batch to On-Line

By Tim Scannell

CW Staff

PROVIDENCE, R.I. — Rhode Island's Department of Transportation (DOT) moved last week from a card-based batch-oriented computer system to an on-line dual minicomputer-based system to keep track of the state's 650,000 active motorists.

The Data General Corp. Eclipse dual M/600 system is not only geared to cut down on vehicle registration delays — which previously consisted of waits of from six to 12 business days — but also eliminates 37 different forms that motorists had to deal with under the old system, according to Frank Perry, chief of data operations at the department's computer headquarters.

Basically, the double-minicomputer system allows Rhode Island registry officials to adopt a staggered registration procedure whereby 10% of the state's drivers register their cars each month, Perry said.

Under the old system — which was operated on the state's administrative IBM mainframe — all vehicle registrations expired March 31, causing an annual rush to process automobile forms.

System Makeup

Located in a specially constructed room at the Transportation Department, the registration system consists of two Eclipse M/600 minicomputers, each with 1M-byte of main memory,

37 Dasher CRT terminals and 13 TP2 printers.

The computers are operated by the department's 11 DP employees, who process in excess of 2,000 transaction/day, and handle close to two million active vehicle records. The system also maintains a three-year history file of both active and inactive registration records, Perry explained.

The DG system also gives the department an expanded capability to handle name variations and can accommodate a 256-char. vehicle registration record. Previously, the department could only input and manipulate files that were 164 char. in length, Perry pointed out.

It took about eight days to con-

vert six 2,400-ft magnetic tapes of IBM-oriented data to the DG minicomputer format, Perry added.

The IBM system, which is currently used by the state for payroll, municipal expenditures and other administrative duties, consists of a 3031, 4341 and 370/168 mainframes.

The Transportation Department will continue to use the IBM system via a remote job entry batch terminal to perform "a substantial amount" of engineering and in-house administrative work.

Only the First Step

Vehicle registrations are only the first step in the department's plans for the DG computers, Perry noted. By the end of the year, the department hopes to have the system linked to other registry offices throughout the state as well as to various police networks.

At the moment, if another branch or the police want registry information they have to request it through a terminal which

(Continued on Page 62)

And 20M-Byte Disk Drive

V77 Gains Double-Speed Tape Drive

BLUE BELL, Pa. — A double-density magnetic tape drive said to have approximately twice the speed of units currently available for the Univac V77 minicomputer family, as well as a 20M-byte cartridge disk drive for that machine, has been introduced by that vendor's Minicomputer Operations.

The Model 0876 is a 9-track device rated at 125 in./sec. It features operator-selectable recording density, according to a spokesman.

At a density of 800 bit/in., the transfer rate is 100K byte/sec; at 1,600 bit/in., the transfer rate is 200K byte/sec, he added.

The Model 0876 is packaged in a low, free-standing cabinet. The controller for the Model 0876, which is mounted with the CPU, will accommodate up to four magnetic tape drives.

The Model F3359 cartridge disk drive features 15M bytes of fixed disk storage and an additional 5M bytes of removable storage. The cartridge drive is said to increase current on-line storage on V77 systems by 100%.

The Model F3359 includes a 312.5M byte/sec transfer rate and an average access time of 40 msec. Up to four drives, pack-

aged in a rack mount, can be accommodated by a single controller, the vendor said.

Available in the third quarter of 1980, the dual-density magnetic

tape drive with controller is priced at \$28,215. The cartridge disk drive costs \$18,000. Univac can be reached at P.O. Box 500, Blue Bell, Pa. 19424.

Bank System Tied to IBM, Burroughs

DAYTON, Ohio — NCR Corp. has introduced a microprocessor-based management system for financial institutions that can communicate with IBM and Burroughs Corp. computers, as well as NCR Century and 8000 series systems.

The Financial Terminal Management System comprises operating software, application programs and hardware including the NCR 3250 series microcomputer system.

The system provides communications with IBM computers using bisynchronous 3270 protocols and with Burroughs and NCR computers using asynchronous ISO protocols.

With both on-line and off-line capabilities, the system can reportedly support a combination of up to 16 NCR 2261 terminals or printers. Step-by-step instructions guide the teller through each transaction.

The one-time license fee for the Financial Terminal Management System software, which includes operating software and applications, is \$700 to \$950 per controller, depending on features.

The purchase price for a basic

hardware system, including 128K microcomputer system, cassette unit and communications adapters, with four NCR 2261 terminals, is \$22,945. Monthly rental under a one-year agreement costs \$1,023.

PDP-11 Memory Boosted

WALTHAM, Mass. — A semiconductor main memory expansion for Digital Equipment Corp. PDP-11 users has been introduced by Cambex Corp.

Configured as a hard disk, Expandastor-11 is said to combine the access time and data transfer rate of main memory with the capacity of disk storage.

Access time for the Expandastor-11 is 350 nsec. compared with 70 msec for the

RK05 and 8.5 microsec for the RS04 fixed-head disk. The transfer rate is 231 microsec per 256-word sector, or more than 2M byte/sec, according to the firm.

Prices for 1M byte range from \$9,512 to \$14,750 for add-on and from \$8,577 to \$11,720 for add-in configurations.

Cambex is located at 360 Second Ave., Waltham, Mass. 02154.



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Add-In for 7/32, 8/32 Offers Four Times PE's Memory

LOS ANGELES — An add-in memory board for Perkin-Elmer Corp. (PE) 7/32 and 8/32 processors that reportedly offers nearly four times as much memory as host-supplied core memory modules has been unveiled by California Minicomputer Systems, Inc. (CMS).

The CMS module offers 256K bytes of random-access memory as opposed to PE's memory boards of only 65K bytes each. In effect, the memory addition allows the 7/32 user — previously limited to a total of 512K bytes of memory — to expand memory capacities. In addition, the 8/32 user can add 256K bytes of memory in a single board at a 25% lower cost than four host-supplied 65K-byte modules, a

CMS spokesman said.

The CMS boards are completely hardware- and software-compatible with PE's 7/32 and 8/32 minicomputers and can be intermingled with PE memory boards. Memory timing is compatible with standard 65K-byte 750 nsec core memory, the spokesman claimed.

Finally, the CMS additions provide local MOS memory operation and will reportedly slave all MOS memories during refresh periods.

The memory add-in costs about \$12,000 per 256K-byte board depending on the user's configuration from the firm at 5534 Westlawn Ave., Los Angeles, Calif. 90066.

R.I. DOT Moves to Mini

(Continued from Page 61)
is not connected to the machines.

One of the Transportation Department's workers then rekeys the information into an on-line terminal there and relays the data back through the stand-alone terminal to the requesting party, Perry stated.

A second phase of the program, due early next year, will put driving license records into the dual-computer system, followed by the addition of driving violation records. Future expansion plans also include linking a third Eclipse minicomputer to the double-barreled system.

Rhode Island officials decided to move from a batch-type vehicle registration system and set up a dedicated computer because the previous card-oriented method was "showing its

age," Perry observed. The IBM system lacked the flexibility needed by the motor vehicle department.

The department did, however, consider adding to the existing IBM hardware to handle Rhode Island's vehicle traffic — which increases at a rate of about 5% to 10% per year — but decided against it, Perry continued.

"After we studied it and looked at the impact it would have on [the IBM system] it was determined that the interests of the state would best be served by having a separate piece of hardware," he added.

The Transportation Department considered a variety of vendors in its acquisitions search, the DP chief noted, virtually calling "everybody in the Yellow Pages."

The department received proposals from six vendors: IBM, Computer Automation, Inc., Wang Laboratories, Inc., Control Data Corp., Univac and DG. The Westboro, Mass.-based DG was eventually selected, based on the advice of a local consulting firm.

Unfortunately, the department's request-for-proposal was issued prior to IBM's announcement of its 4300 series computer which may have added to IBM's favor if that machine was considered during the selection process, Perry claimed.

Hard Disk Drives Offered for LSI-11s

OAKLAND, Calif. — Peritek Corp. has announced a line of Winchester-type disk drives that offer 21M to 280M bytes of formatted storage to users of Digital Equipment Corp. LSI-11/2 and LSI-11/23 microprocessors.

The interface and electronics were designed to allow users to purchase storage units that suit immediate requirements while still retaining the ability to add on memory in 35M- or 70M-byte increments.

The units cost between \$6,550 and \$9,350, Peritek said from 3014 Lakeshore Ave., Oakland, Calif. 94610.

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Bundled HP Desktop Units Offer Savings Up to 23%

PALO ALTO, Calif. — Hewlett-Packard Co. is offering two desktop computers in "bundled" configurations at prices as much as 23% below the total list price of the individual elements.

At the same time, read-write memory prices for the same computers have been cut by as much as 44%.

Stemming from company savings in the areas of sales, administration and inventory resulting from its bundling of some of the "most-requested combinations of options," the price reductions are associated with Series 9800 System 45 and System 35 configurations.

Performance Option 190 gives the monochromatic 9800 System 45B 449K bytes of user-available read/write memory, a second cartridge tape drive, an internal printer and capabilities in graphics, data base management-I/O control, mass storage, advanced programming and asynchronous data communications.

The 9800 System 45B Option 190 costs \$33,500, a 23% reduction from the sum of the individual list prices. For the color graphics System 45C, Option 190 gives similar capabilities for a price of \$49,500, an 18% reduction.

In addition, three 9800 System 35 configurations are now available for problem solving in specific application areas. Each configuration is based on the 9800 System 35A with an extra 64K bytes of read/write memory, totaling 128K bytes.

The problem-solving bundled systems are:

- I/O system (Option 110) which includes assembly language execution and development and I/O capabilities. The system costs \$12,400, a \$3,000 (19%) saving over separate prices.

- Data communications system (Option 120) which includes data communications, I/O, advanced program-

System 45B Gets Color Kit

PALO ALTO, Calif. — Users of Hewlett-Packard Co. Series 9800 System 45B desktop computers can now convert their monochromatic display computers to System 45Cs with full color graphics features.

An upgrade kit, ordered as product number 98771A, is said to enable a user to convert any System 45B to a System 45C. The kit includes a CRT with 96K bytes of graphics displays refresh memory, an interactive light pen, read-only memory containing color graphics firmware and all manuals.

The kit costs \$19,500; removed parts and assemblies associated with the monochromatic display are returned to HP, 1507 Page Mill Road, Palo Alto, Calif. 94304.

ming and structured programming for a \$2,950 price reduction to \$13,400 (18% less).

- Statistics system (Option 130) with HP software for general statistics, numerical analysis; regression analysis, analysis of variance and nonlinear regression analysis. The system costs \$12,400 — a \$2,750 or 18% saving.

The System 35 can accept up to three additional 64K-byte memory boards at \$2,250/board, and the System 45B can accept three additional 128K-byte boards at \$4,500/board.

Additional memory for the System 45C and the "T" configuration of the System 45B costs 2.5 cent/byte, factory-installed. Up to two additional 128K-byte boards can be added to these systems for \$3,200/board.

HP is headquartered at 1507 Page Mill Road, Palo Alto, Calif. 94304.

System Backs Draftsmen

ANN ARBOR, Mich. — A two dimensional, computer-aided drafting system designed to increase the productivity of draftsmen when creating, editing and storing mechanical engineering drawings has been introduced by Manufacturing Data Systems, Inc. (MDSI).

Comdraw IV eliminates repetitive drawing tasks and produces standardized formats, and individual lines and text can be erased selectively, without waiting for the drawing to be displayed. Features include standard graphics symbols, automatic cross-hatching, interactive prompting messages, layering in which portions of graphics and text can be isolated, automatic inch-to-metric conversion and zoom/magnification.

The stand-alone unit includes a perpetual license to use the Comdraw IV application software, a formal training class, a system warranty, a minicomputer with moving-head disk, a 500-line graphics CRT system, an alphanumeric CRT terminal and keyboard and a 12-by-12-in. resolution digitizer for graphics input. The system will be offered in multiple user configurations with added CRT termi-

nals and systems.

The system costs "less than \$60,000" and is also available with a standard drum plotter in either a 22-in. or 34-in. width for less than \$70,000, MDSI said from 4251 Plymouth Road, P.O. Box 986, Ann Arbor, Mich. 48106.

Price Tags Cut On Controllers

SAN DIEGO, Calif. — Datasystems Corp. has separated the price of its line printer controllers from the price of the cable attachments, thereby cutting prices by between 4% and 6%.

For example, a DLP 11 line printer controller for Digital Equipment Corp. equipment formerly cost \$750 including a 15-ft cable, but it now costs \$625. The customer can choose between a 15-ft cable for \$100 or a 25-ft cable for \$125.

Similarly, the DLP 2200 data channel line printer controller for Data General Corp. equipment used to cost \$1,500 and now costs \$1,300 without a cable. Datasystems is at 8716 Production Ave., San Diego, Calif. 92121.

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Datapoint Expands 1500, 1800 With Cartridge Disk Drives

SAN ANTONIO, Texas — Datapoint Corp. is offering expanded 1500 and 1800 small business systems with the addition of models 9310 and 9320 cartridge disk drives.

The Model 9310/9320 removable cartridge disk drives provide up to 40 times more storage than previously available on the 1500 and up to 10 times more on the 1800, the vendor claimed.

In addition, the 9310/9320 increases the I/O speed of the 1500 and 1800 while the products extended storage capabilities allow increased file and program storage — important for the support of both word processing and electronic mail, a spokesman said.

The 9310 drive consists of a disk

drive and controller. The 9320 includes a disk drive, controller and four-terminal serial interface. The integral serial interface permits either the 1500 or 1800 to be used as the central processor in a multiuser Datashare system.

The 9310 is available at a purchase price of \$10,000 and a three-year lease price of \$275/mo.

The 9320 costs \$10,500 for purchase and \$290/mo for lease over three years.

There are monthly maintenance fees of \$80 and \$88 for the two systems, respectively, the vendor said from 9725 Datapoint Drive, San Antonio, Texas 78284.

TDX 75 In./Sec Tape System Geared to End Users, OEMs

HALESITE, N.Y. — A 75 in./sec tape system suitable for end users and OEMs is available from TDX Peripherals, Inc.

Obtainable densities with the system include 800 bit/sec NRZ, 1,600 bit/sec PE and NRZ/PE dual density. Mini-computer interfaces are available to the Data General Corp. Nova and Eclipse and Digital Equipment Corp. PDP-11 minicomputers and DEC LSI-11 microcomputers, the vendor claimed.

In addition, RS-232, IEEE-488 and dual buffered I/O interfaces are available within the TDX enclosure. The PDP-11 interface requires only one quad peripheral controller, while the LSI-11 interface requires two dual

slots and therefore fits LSI-11/2 systems, a spokesman said.

The DG interface is contained on one standard 15 in. by 15-in. board requiring one slot on its computer chassis.

The single unit price for a TDX, 75 in./sec tape system with any of the above interfaces is \$6,985 for 800 bit/sec NRZ, \$7,485 for 1,600 bit/sec PE and \$7,885 for dual density, the vendor said from 150 New York Ave., Halesite, N.Y. 11743.

Floppy Doubles RX02 Storage

HARTFORD, WIS. — A floppy disk system said to have twice the capacity of the Digital Equipment Corp. RX02 floppy disk configurations is being offered by General Robotics Corp.

The RX03 floppy disk system records data on both sides of each diskette in double-density format yielding storage capacity of 1M byte/disk.

The RX03 is a superset of the DEC RX02 and is capable of reading and writing RX02 or RX01 formatted floppy diskettes, the vendor said.

The RX03 comes in the vendor's Gemini floppy disk package and includes an LSI-11/2 MPU, 64K bytes of random-access memory, DLV11 serial RS-232 port, hardware bootstrap, two RX03 floppy disk drives and controller for \$9,500. The firm is also offering the RX03 in its Tristar package which costs \$11,000 from General Robotics at 57 N. Main St., Hartford, Wis. 53027.

Timer Circuit Boosts MPUs

COLUMBIA, Md. — Two series of microcomputers that utilize a counter timer circuit containing four separate timer devices for flexibility are available from Columbia Data Products, Inc.

The Commander 500 and 900 series include dual Z80 MPUs with up to 80K random-access memory (RAM) and 320K disk storage, CRT display, full keyboard, four RS-232 ports and parallel bus.

The basic 532 system with 32K RAM, 14K programmable read-only memory (Prom), 5-in. CRT, four RS-232 ports and 160K-bit disk costs \$3,995. The 932 basic unit with 32K RAM, 4K Prom, 9-in. CRT, four RS-232 ports and 160K-bit disk also costs \$3,995 from 9050 Red Branch Road, Columbia, Md. 21045.

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Suit Filed to Halt NCR Bid for Adds

WILMINGTON, Del. — A shareholder of Applied Digital Data Systems, Inc. (Adds) has filed a class action suit in court here to enjoin NCR Corp.'s tender offer for the outstanding common and preferred shares of Adds.

Moreover, the attorney general of the state of New York has ordered an investigation to determine whether the tender offer complies with the state's Security Takeover Disclosure Act.

The suit charges that the tender offer of \$12 per share for common stock and \$27 per share for preferred stock is inadequate. Furthermore the complaint alleges that certain members of Adds management entered into an agreement with NCR for the tender offer for their own personal benefits. These benefits include the preservation of their positions with Adds and the securing of stock options previously not approved by Adds shareholders according to the suit.

The suit was filed by Martin Lansman against NCR; its subsidiary, NCR Development Corp., which is making the tender offer; Adds; and eight individual directors of Adds.

At press time, NCR was studying the suit and preparing an answer, a spokesman said. (Continued on Page 66)

IBM 4341 Group 2 Stirs Few Rivals

IBM's recent announcement of the 4341 Group 2 processor [CW, Sept. 22] caused little stir among plug-compatible manufacturers.

Pointing to the expansion of its AS/5000 family, National Advanced Systems (NAS) said the 4341 Group 2 is exactly what the company expected. Although NAS beat IBM to the punch on the introduction date by about three weeks, a NAS spokesman said his firm would not have to make any changes to its latest offering.

A spokesman for Magnuson Computer Systems, Inc. said that firm will be responding to IBM's announcement within "the next week or so."

Among other features, the IBM 4341 Group 2 reportedly offers throughput 80% faster than that of the Group 1 4341 and has up to 8M bytes of main memory.

European PCM Market: Wide Open, Competitive

By Marcia Blumenthal
CW Staff

Nixdorf Computer AG's recent introduction of an IBM-compatible system for the European market [CW, Sept. 22] may muddy the waters for IBM and U.S. plug-compatible manufacturers (PCM) in Europe, but opportunities for PCMs abound in Europe, according to industry observers.

Nixdorf is the fourth European company to offer IBM-compatible systems. Rather than manufacturing their own systems, European PCMs are largely importing them from Japan.

In Nixdorf's case, Elbit Computers Ltd. of Haifa, Israel, is supplying the technical know-how and components. Nixdorf, however, said it has committed 200 people and some \$18 million to the plug-compatible venture. In addition, the firm, through the acquisition of the Computer Software Co. last May, has a captive supply of IBM operating software. The company said it expects to introduce the 8890 into the U.S. market during the first quarter of 1981.

On the hardware side, Elbit, founded in 1966, was owned in part by the Israel Defense Ministry. In 1979, the government share of the company was sold to Control Data Corp., and Elbit began turning its military computer expertise toward the commercial sector.

Elbit first entered the plug-compatible business in 1976 by offering an IBM-compatible 3277-2 terminal, according to Shabtay Levy, general manager of Elbit, Inc., the Israeli company's wholly owned U.S. subsidiary.

Nixdorf is orienting its two 8890 systems specifically to the mid-range market, the IBM 4331 and 370/148 performance range for now and will be fairly successful in Germany, John Curran, director of European marketing for National Advanced Systems (NAS), remarked.

However, Curran does not think Nixdorf or any other European PCM vendor will significantly impact U.S. PCMs already doing business in Europe. He said the European installed base of NAS/Intel Corp. machines stands at 170 and Amdahl Corp. has 29 systems installed. Both these companies already have established networks of sales and service personnel.

The impact, if any, may come on newer companies, such as Magnuson Computer

Systems, Inc. which recently established a European distributorship in the UK, Curran said.

Presently in Europe Siemens AG of West (Continued on Page 66)

Insac Seeking Mini House

By Connie Winkler
CW Staff

NEW YORK — Insac, Inc., the UK-backed company that this year acquired a stateside IBM systems software house, is looking to add a minicomputer operating systems house in the next year.

"The strategy is in place," Peter Dine, president of Insac, Inc., said here recently. Insac would begin with systems software for Digital Equipment Corp. processors and then expand to other mini systems, he said. The company is looking at West Coast firms and the acquisition could come by mid-1981, Dine said at a press briefing here announcing the final touch on Insac's acquisition of Altergo Software, Inc.

Altergo, acquired in March, changed its name to Insac Software, Inc., and moved its headquarters from Boston to Atlanta, said Altergo president and founder Joseph Ganem.

Insac, Inc., a New York-based U.S. company, is backed by the British National Enterprise Board, which Dine described as "a billion dollar investment corporation." The Enterprise Board is an "arm's length venture capital" effort with the British government, Dine explained.

Insac here will not only be looking for mini systems software houses, but also specific products and may encourage the development of those products, Dine said.

Insac Software's most popular products are Shadow II, a teleprocessing monitor, and Systems/Manager, a resource management and control system, both with about 200 installations. Other products are: Quota II, Conversational Program Generator, Guts (a time-sharing, remote entry and text editing system), Improve/Mon, Improve/CICS, Improve R/T and Improve/DS.

Insac has about 50 employees and sales of about 4 million annually, Dine said.



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DDP Market Expected to Hit \$37 Billion by '88

NEW YORK — The distributed data processing (DDP) market is expected to reach \$37 billion over the 10-year period through 1988 for minicomputers, terminals and data communications controllers necessary to implement the DDP systems, according to a two-volume market study by Frost & Sullivan, Inc. (F&S).

The market report indicated that business minicomputers will reach \$12 billion in sales from 1979 to 1988. Data entry processing terminals will

garner \$9.3 billion in sales over the 10-year period, alphanumeric display terminals will sell \$6 billion worth of equipment and data communications minis and micros will account for some \$9 billion in sales by 1988, F&S said.

The DDP market reached \$2.1 billion in 1979 and will increase to \$2.6 billion in 1981 and then shoot up to nearly \$6 billion in 1988, the report said.

Although an attractive market, competition is also very intense, according to the market report. Five types of

suppliers are jockeying for position: mainframe vendors, minicomputer makers, small business system vendors, data entry terminal suppliers and data communications terminal producers, F&S noted.

IBM will be the major supplier with a current 11% market share which will climb to 19% in 1983 and to 30% by the mid-1980s, according to the research firm.

"IBM is coming on very strong" with its Series/1 mini, F&S maintained and "will become stronger as the 4300 series is delivered." Digital Equipment Corp.'s current 30% market share, on the other hand, is projected to decline to 16% by 1985, according to the report, which noted that DEC will be hit hard by IBM's onslaught.

Other companies projected to make big gains include Univac, going from a 3% market share to 9% by the mid-decade; Wang Laboratories, Inc. from 1% now to 4% over the same time period and Mohawk Data Sciences Corp. from 12% to 14% in the data net entry/processing terminal segment of the marketplace, F&S said. The report added that Wang could be a "dark horse in this market," exceeding all ex-

pectations.

Users surveyed in the report indicated they intend to continue to increase their use of DDP. Some 80% of the responding users intend to employ DDP technology with lease vs. purchase in a 1.6:1 ratio, F&S reported. Users indicated they were concerned about systems software, interfacing and data communications.

Nothing less than "a complete reorganization of the DP system is required," F&S warned. Implementation directly affects the mainframe, all peripherals and data communications facilities and also requires intensive controls, training, support and service. Security is even more important, F&S stated.

F&S contended that the enormous amount of effort required is the reason why the trend toward DDP is proceeding "at a much slower pace than originally expected," but the report noted that "DDP implementation will appreciably pick up speed over the next three years."

The Distributed Processing Systems Market report costs \$900 from F&S at 106 Fulton St., New York, N.Y. 10038.

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Europe Turning to PCMs

(Continued from Page 65)

Germany offers a Fujitsu Ltd. IBM-compatible system, although some observers note the machine may not be truly compatible. In recent months both Olivetti of Italy and BASF of West Germany signed agreements with Hitachi Ltd. to market that firm's high-end M200H system. It is believed these firms are also selling less powerful Hitachi mainframes. Like its European counterparts, NAS is marketing the M200H in Europe, Curran said.

Olivetti is also marketing a PCM system from IPL Systems, Inc., the maker of the Omega line for CDC.

This activity in the European PCM marketplace appears to signal a growing acceptance by European users of an IBM-compatible alternative. International Data Corp. (IDC) of Europe estimated that by the end of 1981 there will be some 725 compatible systems installed in Europe.

By the end of this year, PCMs are expected to hold a 22% share of the high end of the 370 market in Europe, IDC Europe noted. The growth in share is due to estimates that 69% of the 360 base and 67% of the European 370 users will change CPUs this year.

Unlike the U.S., IBM is far more con-

strained from retaliatory tactics against users considering PCM alternatives. The governing body of the Common Market strictly forbids practices such as moving up delivery dates for users considering PCMs, Curran observed.

After interviewing more than 200 users, IDC Europe concluded that 38% of IBM users with low-end 370s would consider changing vendors while 83% of users with IBM 168 systems would consider a switch.

While loyalty to a national vendor is strong in European countries, one informed source, who asked not to be identified, doubts that BASF or Olivetti will be successful with their PCM alternatives. In Italy, Olivetti, Europe's largest office equipment vendor, sold only 4 PCM machines in eight months, the observer said.

Yet the entry of PCM vendors on the European scene has given the IBM-compatible alternative credibility.

Europe is a conservative market, Curran said, noting that only 25% of a sale has to do with the actual hardware. The other 75% is emotional, involving trust between the vendor and user. "Users don't even benchmark, they believe you," he noted.

ICS Wins Software Dispute

IRVINE, Calif. — Interactive Computer Systems, Inc. (ICS) has received a favorable ruling by a U.S. District Court in New York in its complaint against Three Star Programming Systems, Inc. for misappropriation of and copying a copyrighted and trade secret business application package, CBS III.

ICS, a subsidiary of Management Assistance, Inc. (MAI), produces software for Basic Four Corp., another MAI subsidiary that joined ICS in the suit filed last April.

Although the terms of the consent judgment were not revealed, Three Star may not market or use CBS III

and must return to ICS all such software and documentation and all software or documentation derived from that package.

Suit Filed to Halt NCR Bid for Adds

(Continued from Page 65)

man said. The tender offer was made Aug. 26 and is in effect until Oct. 1. As of Sept. 15, only 188,562 of Adds 4.6 million outstanding shares of common and 3,573 shares of more than 160,000 shares of preferred stock had been tendered.

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Lunch

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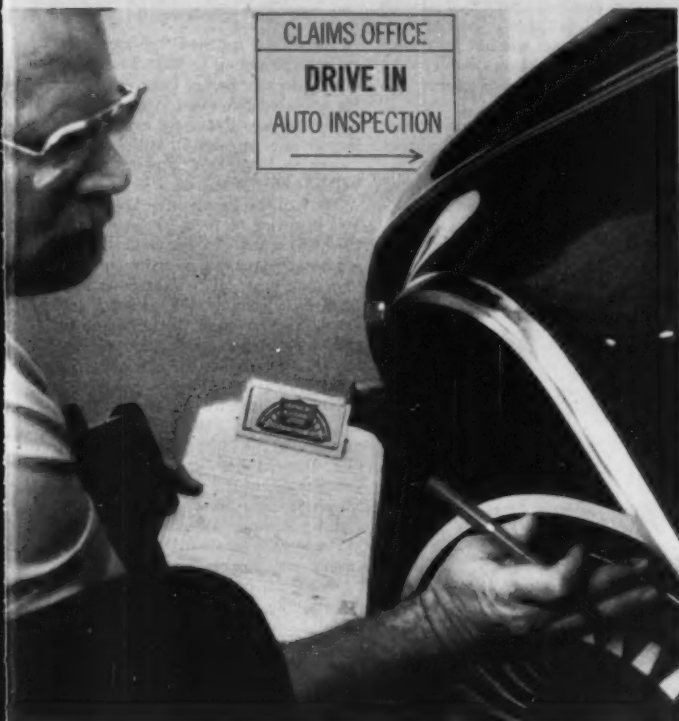
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DP Dialogue

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Notes and observations from IBM
that may prove of interest to
data processing professionals



Good Policy for Farmers Insurance: DDP With the 8100

"The simplicity of operation and maintenance of the 8100 is important to us," says Lewis J. Bohache of the Farmers Insurance Group of Companies. "Clerical employees in our regional offices have learned to operate it with only one or two days of training."

"The 8100 is easy to install—it plugs into a standard wall outlet. In fact, we were able to set up and start our system by ourselves. Since it does not require a special computer room, it is located in the policy service area."

Farmers uses the IBM 8100 Information System in a distributed data processing (DDP) network to provide better service to its property and casualty insurance customers. It has meant much quicker response and a much lower error rate.

In each of Farmers' 11 regional offices, operators enter the details of new and revised policies into an 8100. Preparing the specifics of insurance coverage for entry requires the use of a complex code, which clerks formerly consulted in a printed manual. Today, the 8100 prompts the operator through the terminal display, providing

guidance in the coding of input.

"The result," Bohache notes, "has been improved productivity as well as much greater accuracy. The prompting system has enabled us to reduce the operator training period to three to four weeks, from a previous three to four months."

Stands Alone During Day

Each 8100 operates as a stand-alone processor for data entry during the day, and then batches the policy data over a WATS line to an IBM 3033 Processor at Farmers' Los Angeles headquarters at night. The next day, the 3033 transmits the formatted policy data back to the regional office, and a printer there produces the complete policy under the control of an IBM 4331 Processor.

"We're installing an online inventory control system to run on an 8100 here at headquarters, to manage supplies and equipment," Bohache adds. "This is feasible only because the 8100 is simple and 'user-friendly' for online applications. We can train people from the purchasing department to use it."

A Farmers Insurance claims inspector examines damage to a policyholder's automobile. With distributed data processing on the IBM 8100, Farmers speeds up policy changes which assist its personnel in prompt verification of coverage for claims handling.

Federal Express is 'One Large Integrated Real-Time System'

"It's easy to use our air courier service: just pick up the phone," says James Barksdale of Federal Express Corporation. Behind that simplicity is the management of two fleets—vans for door-to-door pickup and delivery, and aircraft which fly nightly round trips between Federal's 132 full-service stations and a "hub" facility in Memphis.

Barksdale, senior vice president, continues: "As a company, Federal Express is one large integrated real-time system. And our data processing reflects that: every one of our applications relates to almost every other. Weather reporting affects flight planning and operations, which affects dispatching and crew management. Flight hours logged under the engineering and maintenance system have an influence on parts inventory, and so forth. Many different computer systems must communicate with each other to keep this 24-hour operation tightly integrated."

With IBM's Information Management System/Virtual Storage (IMS/VS), all related data is under one master, Barksdale explains. "Any number of programs can access the same record," he points out. "Today's data bases are compatible with any future applications, and we can add and subtract fields of information. All data related to one customer, for example, is under one master, so that all spellings are

the same and data is consistent."

The most crucial application is customer order processing, which puts more than 30,000 transactions per day through the IBM 3031 Processor in Memphis. Representatives take calls from customers across the U.S. and enter orders for service

through IBM 3277 Visual Display Stations in two telephone centers. The 3031 prints out each order in the nearest station to the sender, where a dispatcher radios the driver of a van to make the pickup.

"IMS made these applications much easier to implement," Barksdale adds. "We

put together these online systems—950,000 lines of code—in 20 months. Once our staff had one or two IMS systems behind them, they put new ones online very quickly. IMS/VS lets us concentrate on the applications rather than data base management and teleprocessing."



At night, sorting and loading of packages into outbound aircraft is done swiftly at Federal's "hub" in Memphis. IMS/VS helps the company's computer applications communicate with each other.

DP Dialogue is designed to provide you with useful information about data processing applications, concepts and techniques. For more information about IBM products or services, contact your local IBM branch office, or write Editor, DP Dialogue, IBM Data Processing Division, White Plains, N.Y. 10604.

IBM
DATA PROCESSING DIVISION

System/34's Popularity Changes Bureau's Style

By Rita Shoor
CW Staff

MILWAUKEE — The popularity of IBM's System/34 among Harris Data Service, Inc. (HDS) clients has had a major effect on the company's services, according to Randy Cain, HDS marketing manager.

When HDS started up eight years ago, it essentially functioned as a service bureau for the majority of its customers, he recalled. "Approximately 70% of our resources went towards processing information for our clients on an HDS in-house system. The remaining 30% of our business involved contract programming, software development and DP consulting work."

Increasing numbers of HDS clients have set up their own system, how-

ever, and the split is now closer to 50-50, he estimated.

Programmer Scarcity

Cain also felt that the System/34 was drying up the available labor market in terms of experienced RPG-II applications programmers.

While some industry observers have indicated that DP trade schools tend to offer higher level languages such as Cobol or Fortran rather than RPG, the Milwaukee area is moving in another direction, according to Ken Morris, an HDS project coordinator.

In fact, one technical institute has made room in its regular curriculum for an RPG course by dropping the second semester of the assembler language course to the evening division,

he said.

With the increase in customer-owned equipment, Cain has noticed a burgeoning interest in standardized software packages.

"Rather than having HDS develop a tailored system for a particular end-user, the customer will opt for one of our software packages that can be tailored to meet his requirements," he said.

Cain felt that awareness and interest in software packages has almost "doubled in the last six months. As recently as one year ago, we detected very little interest in software packages among the attendees at various shows and conferences.

"Our customers get so excited by the prospect of running their own in-

house systems that one of our main concerns is to maintain file integrity," he said. This type of system makes it much easier for the user to "blow away files."

IBM Involvement

Future plans for the DP support center call for adding an IBM System/38 during the first half of 1981, Cain said. He appeared interested in the concept of the 38 as a data base machine although he stressed that he didn't "want to have IBM experimenting" with the HDS installation.

"We had the first System/34 in this area in spring of 1978," he said, "and IBM was actually calling us to find out what was happening with the system."

For one year, HDS utilized its own 128K-byte System/34 for research and development. "Now, the entire third shift is devoted to production processing," Cain described the processor as a "real workhorse."

HDS also has three System/3 Model 10s, each with 32K bytes of main memory, at the same installation, Cain said. Two Model 5445 plug-compatible disk drives and three printers from Memorex Corp. are among the peripherals hooked up to those processors.

When asked whether there were any special maintenance problems caused by tying the plug-compatible peripherals to the System/3s, DP manager Herb Harris summed it up by stating that "Memorex treats us like gold" while rating the IBM service as mediocre.

He indicated that IBM's response to service calls became sluggish about a year after HDS went from a standard service agreement to "status three mode." This is a situation in which HDS pays a third party — Computer Maintenance & Leasing corp. (CMLC) — a monthly contract fee and CMLC, in turn, pays IBM its hourly rate when service is required for HDS equipment.

Basic Four, Sorbus Get Division Status

NEW YORK — Management Assistance, Inc. (MAI) is taking action to operate its wholly owned subsidiaries Basic Four Corp. and Sorbus, Inc. as divisions of MAI beginning next month.

The move was designed to reduce the company's domestic taxes and the number of financial reports required, the firm said.

The redesignated operating entities will be named Basic Four Information Systems Division and Sorbus Service Division of MAI.

The existing management structures will continue.

one for the files.

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Peter P. Blozis (right) is Wilson's Vice President, Information Services Division. Lea Edmunds is Technical Services Manager.

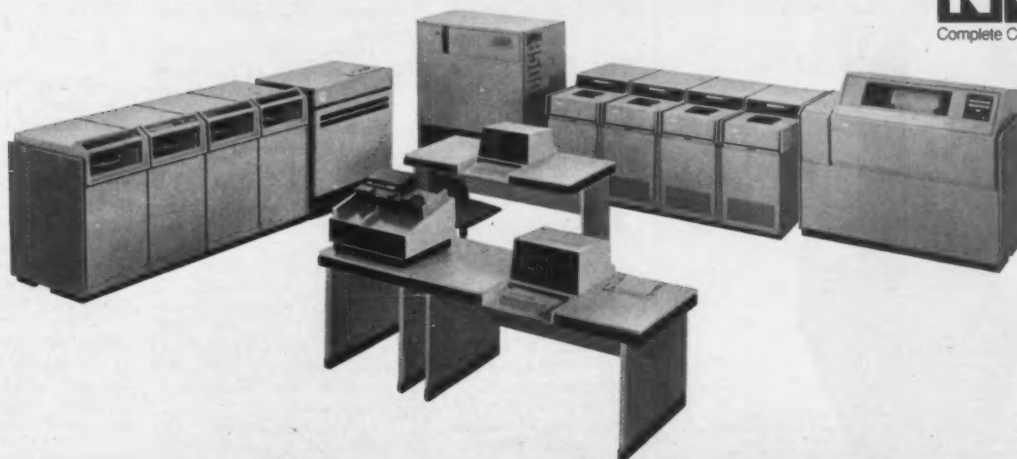
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Faster Intel 8086, Zilog Z-Lab Lead Debuts

By Molly Upton

Special to CW

ANAHEIM, Calif. — Microprocessor-related products unveiled at Wescon/80 included a faster 8086 and a math coprocessor from Intel Corp.; Zilog, Inc.'s Z-Lab, which links development systems via its Z-Net local architecture; and other assorted hardware and software features from most of the major

microprocessor vendors.

Intel's 8086-1, a 10 MHz version of the 8086, is said to

The 8086-1 features an execution time 100% faster than the original 8086, a spokes-

networking capability available by May 1981.

In attempts to enable Z800 programs written in any language to call Z8000 programs written in any other language, Zilog has established standard calling conventions that specify parameter-passing and register usage practices.

Other Zilog announcements include the Z F10 buffer circuit that synchronizes devices that operate independently or at different data rates, Zilog said.

It was designed to operate both with Z-Bus-compatible CPUs and non-Z-Bus-compatible CPUs, the com-

pany said.

The Z-F10's buffer is said to improve I/O overhead by up to two orders of magnitude. It costs \$39 in lots of 100 with samples available in November.

Zilog added some 6 MHz versions of new peripherals to its Z80B; previous units are 2.5 MHz and 4 MHz.

52200 Micros

American Microsystems, Inc. showed its 52200 family of single-chip microcomputers and its Phoenix-1 development station, which sells for \$5,495 and includes CRT, keyboard, 48K random-access memory, three small floppies, two RS-232C ports and software.

Mostek Corp. unveiled a number of add-on, add-in memory cards for Data General Corp. and Digital Equipment Corp. systems. The Eclipse model, compatible with all Eclipses except the S-140, has 128K by 21 and costs \$5,810. The PDP-11 add-in cards with 128K by 18 and less than 100 nsec write access time, sells for \$3,150.

Mostek also announced an add-in memory card for DG's Nova 4 with a capacity of 128K words and word length of 16 or 21 bits. Write access time is 200 nsec. The MK 8018 card is priced at \$5,700.

The Mostek 37000 is a 64K read-only memory with a 250 nsec access time that costs \$25.65 in lots of 1000.

Upton is editor of EDP/Industry Report, an International Data Corp. publication.

CW at Wescon/80

be 15% to 20% faster than competitive 16-bit devices, and Intel is calling it the fastest 16-bit microcomputer now available.

man said. Available in sample quantities now, 8086-1 production quantities are scheduled for fourth quarter 1980.

Intel is also working on an as-yet unannounced member of the 8086 family, a memory management unit on the CPU that will be five times as fast as the original 8086, a spokesman hinted.

In addition, another device will reportedly incorporate more of the surrounding components on the same chip. These developments will be announced in 1981.

Available now is the 86/20, a two-chip set with the 8086 and the 8087 math coprocessor. The 86/20 performs 32-bit floating-point multiplies in 19 microsec — said to be 10 to 100 times faster than previous microcomputers using software or partial hardware floating-point support.

Prices in lots of 100 are \$465 for the 86/20 and \$410 for the 88/20.

New Names

Intel is renaming its products. The 8086 falls in the category of IAPX advanced processors and the IAPX 86/10 is the 8086, while the 86/11 is the same CPU with additional I/O processing; the CPU with numeric coprocessor is the 86/20, while the unit with both the extra I/O and numeric coprocessor is called the IAPX 86/21.

Intel also unveiled what it calls the fastest 64K-bit erasable programmable read-only memory with a worst-case access of 250 nsec.

The device, called the 2764, costs \$163 in lots of 100. Volume shipments will begin in the first quarter, 1981.

Zilog Announcements

Zilog also had a raft of announcements, including a description of one of the first systemwide applications for its Z-Net.

The Z-Lab was designed for users developing products based on the Z8, Z80 and Z8000 and is implemented on three products: Zilog's Z80A-based Z-lab 80 program development station; the Shared Data Station 2/01 and the Network Station Transceiver.

Zilog said it plans to add the 16-bit Z8000-based program development station.

Zilog's Z-Net uses a single-channel, packed-switched, local computer network with fully distributed control.

The Z-Lab 80 program development station, priced at \$13,750, is scheduled for delivery by January 1981, with

RCA Shows Peripherals For Micros

By Molly Upton

Special to CW

ANAHEIM, CALIF. — RCA, which exited the mainframe business several Septembers ago, showed several products designed for use with its microprocessor development system that can also be used as peripherals to other systems.

A dot matrix printer CDP 185050, costing \$2,995, can be used with any system having a Centronics Data Computer Corp.-type parallel interface, the company said.

Speeds range from 200 line/min with 72 char./line to 300 line/min with 40 char./line. The character font is a 7 by 7 dot matrix, and the head is said to have a life of one year of normal operation.

Cosmac Terminal

Another product from RCA's Solid-State Division is the Cosmac CRT terminal, CDP185040, a general-purpose intelligent terminal that can also be used with RCA's Cosmac microprocessor systems.

The 24-line by 80-char. display includes 14 full-screen edit function keys such as cursor positioning, character or line insertion/deletion, scrolling and windowing. The terminal costs \$1,195.

RCA expanded its family of microboard computers with the CDP185604, which cost \$129 in quantities of 100 or \$199 in small quantities. The single board includes a CDP1802 Cmos microprocessor, a clock, 512 bytes read-write memory, parallel I/O ports, room for interface and sockets for user-selected read-only memory.

With the terminal and printer, RCA featured a Cosmac Development System IV that costs \$12,000 for microprocessor systems designed around the RCA CDP1802 and 1804/5 devices.

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Contracts

The Rath Packing Co. and Creative Data Services have ordered the 90/40 system from Univac, and Century Manufacturing Co., Retail Systems, and The Banca Popolare di Bari (Italy) have all ordered Univac's 90/30 systems.

Japan Steel Works of Tokyo has ordered a Univac large-scale computer system, the 1100/60 processor.

Integral Business Computing (IBC) has received the International Computer Programs \$1 Million Award for sales over \$1 million, of IBC's Travel On-Line Universal Reservation System, Tours.

Evans Products Co. ordered \$1.3 million worth of computer-based retail data processing systems from International Computers Ltd.

Lambda Biosystems, Inc. will install a multiuser computer system in the laboratory of St. Joseph Mercy Hospital in Mason City, Iowa.

In Power, Versatility Mainframes Challenged by 16-Bit Micro Makers

By Molly Upton
Special to CW

ANAHEIM, Calif. — Microprocessor makers have set their sights on rivaling mainframes' power and versatility, according to speakers at the Wescon/80 session on "Benefits of Advanced Concepts of 16-Bit Microprocessors."

A corollary to the increased capabilities being offered by the new 16-bit processors and their families of associated devices is that buyers are being compelled to select one vendor: The days of mixing and matching components may be over, speakers said.

Some microprocessor manufacturers seem to have looked at the limitations of some minicomputer architectures and directed their efforts toward architectures that would support capabilities associated with mainframes or at least superminis.

In addition to supporting high-level languages efficiently and boasting an improvement in throughput, the 16-bit micros offer operating system support through instruction extension via auxiliary processors, virtual memory, protection of memory space and multiprocessing, according to Subhash Bal, product marketing manager at National Semiconductor Corp.

Auxiliary Chips

One means of increasing the processing power available is

the addition of other intelligent chips that are either coprocessors or intelligence dedicated to specific tasks such as peripheral controllers.

"The concept of auxiliary chips [variously called slave, coprocessor, extended processor] attached to main processors allows a graceful extension of the instruction set," Bal stated.

There is some various semantic confusion surrounding various types of coprocessors. Heather Bryce, microcomputer engineer at Motorola, Inc., distinguished between the master-slave system in which one master processor controls the system, and symmetric or anonymous processors in which identical processors share common memory and I/O and are treated the same.

Master-slave devices are most appropriate for applications in which each slave has special purpose requirements, Bryce remarked.

In the symmetric or anonymous processor scheme, the executive "floats" from one processor to another and tasks can be allocated to processors on an "as available" basis. However, software to protect common system resources, allocate tasks, and float the supervisor can be quite complicated. The MC68000 can support this organization, but Bryce did not give any examples.

Another method of organization is to let each microprocessor have its own supervisor

The Advanced Micro Devices, Inc.'s (AMD) AMZ8000 has a 24-bit physical

memory, according to Steven Dines and Krishna Rallapalli of AMD.

The new breed of 16-bit CPUs offer various forms of memory protection or separation of operating system from user programs.

Upton is editor of "EDP Industry Report," an International Data Corp. publication.

CW at Wescon/80

routes in local memory, Bryce added. However, semantic confusion arises when one considers the intelligent support circuits, such as those controlling peripherals. These can "share the instruction stream and can take control of the host CPU's local bus, are actually extensions of the CPU's architecture and instruction set and are functionally like a coexisting processor to the host CPU," Dave Bursky of Electronic Design Magazine explained. This type of circuit has been called the coprocessor by Intel Corp., the extended processing unit by Zilog, Inc. and the slave processor by National Semiconductor Corp., he said.

Virtual Memory

Some 16-bit CPUs have virtual and some do not, but those that do not, such as Motorola's MC68000, have support circuits designed for virtual.

Intel's 8086 offers physical addressability of 16M bytes with virtual addressability of 1G byte per application, according to Richard Markowitz of Intel. The Intel 8086 has a 20-bit physical address.

cal address and can access up to 8M bytes of logical memory residing in 16M bytes of

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Panelists Find Bubble Memories Suitable for Harsh Environments

By Molly Upton
Special to CW

ANAHEIM, Calif. — Despite their currently high price tags compared with other types of memory, bubble memories have found a home, according to panelists at a Wescon/80 session on "Bubble Memory Applications in Harsh Environments."

Bubbles are appropriate for use in harsh environments, such as factory numerical control applications where dust and moisture can be fatal to other types of memory such as cartridge and disks, panelists indicated.

Philip Spiegel, customer marketing manager for Intel Magnetics, Inc., said his company estimates the total worldwide market for bubble memories will reach \$30 million in 1980 and is capable of growing to \$1 billion by 1985.

The prediction is based on the premise that low system costs will be achieved by 1985 through production of 4M bit devices and the resultant reduction of support circuits per

system.

Because of lower costs, wider use of bubbles will occur outside of the harsh environment, he said.

Intel Magnetics projects the cost/bit bubbles by 1985 should come close to equaling that of floppy disks. The cost of bubbles is dropping by a factor of at least two every year.

Bubbles are suitable for use in environments such as process control, robotics or numerical control, oil exploration, aircraft data recording, portable instruments, telecommunications and point of sale terminals, he said.

These environments impose various requirements and/or problems such as contamination, radiation, temperature, vibration and handling, he continued.

David Behner, project engineer at Honeywell, Inc. LISD, supports of bubble memory. The closest alternative to bubble is the 8-in. Winchester disk, he said, but the bubble obviates the need for boot-

strapping a system should an element fail, he indicated.

Honeywell uses bubbles as storage for microcomputer controllers in numerical control applications in both sheet metal and printed circuit fabrication shops. Bubbles satisfy several requirements, he said. They are self contained and immune to contaminants such as oil droplets. In addition, the density permits adequate storage capability. In some applications Behner said he needs up to 500K bytes.

Bubbles' access time is faster than cassettes and thus comes closer to matching the potential speed of the board tester of up to 180K/min.

Behner also sees access speeds of bubbles in 1981 being twice as fast as floppies.

The return on investment is a bit difficult to calculate, he said, since there is little data available. However, if the manufacturers make their goals regarding cost reduction, "we should see a 30% to 50% price decrease in the first half of 1981," he said.

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Semi, Mini Makers Seen 'Passing in the Night'

By Molly Upton

Special to CW

ANAHEIM, Calif. — Representatives from semiconductor houses and a minicomputer firm, given the chance to be open about whether they are on a collision course or merely ships passing each other in the night, said they are simply passing in the night.

However, none denied that there are areas in which their products overlap. Prompted by questions submitted in advance, from a press panel, panelists concurred that the principal dividing line between the mini makers and the semiconductor suppliers is that the mini makers take a more comprehensive systems approach emphasizing software and service.

If there is a conflict, it would be in the area of boards commented Pierre Lamond of National Semiconductor Corp. But although mini makers are supplying boards, they have not yet gone into the components business, he observed.

When customers' volume needs are high enough, they normally convert from boards to components, he added.

Need for Standards

Jack Carsten, vice-president and general manager of Intel Corp.'s Microcomputer Electronics Division, said that Intel and Digital Equipment Corp. only share one customer among their top 10 buyers.

Carsten stressed throughout his responses the need for industry standards and said that

cense its basic architecture, but that there are cooperative efforts such as its Ethernet

as to how they think the industry will progress despite this shortage.

DEC's Long indicated his company is moving toward standardized applications directed at vertical markets, such as dentists.

Carsten said Intel is working to encapsulate operating systems and high-level languages on chips. He foresees the ability to supply more complete, high-level-oriented solutions over the next decade.

These advances, coupled with the passing acquaintance the public is getting through home computers, should know enough software to get by and exist as parasoftware engineers in the industry in

five to 10 years, Carsten added.

As semiconductor suppliers' products become more complex, the days of second sourcing, a traditional practice among purchasing agents, may become a thing of the past, panelists indicated.

Lamond explained that although the purchasing manager sees semis as components with several sources, as integration increases the products get closer to the type of business purchasers do with DEC and DG, where there are not second sources.

Carsten added, as "systems become complex and the software/hardware becomes less hard, it's difficult to second source" because the traditional cookie cutter approach has changed.

Moderator Tony Hamilton, chairman of Avnet, commented that his firm has expanded to handle peripherals as well as components and that it is logical it could expand still further with software to glue various parts into a system. The software could be both off-the-shelf as well as a type of custom, he added.

Upton is editor of EDP Industry Report, an International Data Corp. publication.

CW at Wescon/80

if microprocessor vendors face diminishing shares of the market, it will be because of the absence of standards and very large-scale integration production constraints.

Bill Long, vice-president of corporate marketing for DEC, observed that relationships between mini makers and semiconductor houses can be complex. For instance, DEC is a customer, supplier, competitor and partner to Intel, all at the same time. "Perhaps there's a collision of sorts, but it's not much more than a glancing blow," he said.

Panelists felt the market is plenty big enough for all, including IBM.

However, the press representatives had no difficulty recalling instances that would seem to indicate conflict, such as suits filed by DEC and Data General Corp. against National Semi and Fairchild Camera & Instruments Corp., respectively, when the semi makers came out with microprocessors that were compatible with the minis.

Asked whether they foresee cross-licensing between semi and mini makers, panelists tended to say no. Long said it is not likely DEC would li-

project with Intel.

Carsten indicated that as business becomes more software-intensive, it is less likely the manufacturer will license because of the additional software investment involved.

Severe Competition

Panelists acknowledged that there is severe competition among all types of vendors for software and hardware engineers, and gave some insight

Strategic Business Services Offers 10 R&D Reports

SAN JOSE, Calif. — In keeping with its newly expanded R&D effort, Strategic Business Services, Inc. announced the release of 10 major research reports.

The reports are: "IBM's New Office Automation Strategy"; "Local Area Networks (Lans) — Market & Opportunity"; "Switching Systems in the Office of the Future Vol. II"; "Strategic Analysis of Software & Hardware Maintenance" (Large Systems); "Winchester Disks in Emerging Office Systems";

The reports range in price from \$950 to \$1,500, and customers who have varied areas of interest or require multiple copies are entitled to a subscription service at a 35% - 50% discount. Additional information is available from Susanne Sonnabend at Strategic Business Services, Suite 215, 4320 Stephens Creek Blvd., San Jose, Calif. 95129.

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R&D Plan Aimed At Small Firms

WASHINGTON, D.C. — Currently being considered by the Department of Defense Research and Engineering is a new program aimed at increasing the participation of small, high-technology businesses in defense-related research and development.

The department feels that some of the most innovative technology frequently originates in the smaller R&D firms, and now hopes to tap this previously excluded sector.

Firms interested in receiving additional information about this program may contact the director, Hal Felsher, at the Office of the Under Secretary of Defense for R&E, Room 2A 340, The Pentagon, Washington, D.C. 20301.

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U.S. Electronics Edge Challenged Progress Won't Ensure Dominance: Consultant

By Molly Upton

Special to CW

ANAHEIM, Calif. — "Technological progress does not ensure dominance" in electronics markets, Jerry Wasserman of Arthur D. Little, Inc. told attendees at Wescon/80's marketing day program.

Although the U.S. electronics industry represented 3.5% of the gross national product in 1979 and has grown to \$90 billion in sales, its market dominance is being challenged.

While technological progress in the electronics industry has been significant — in 15 years the density of semiconductors has improved by 10³ and even more if one includes the 256K and 512K chips discussed in recent technology conferences — Wasserman urged attendees to change their ways in order to meet the new challenges imposed by other nations' proficiency.

"Successful management policies for the '70s are not appropriate for the '80s and need modifications," he stressed.

Wasserman outlined the steps other nations are taking to enhance their positions in the electronics markets, why

the U.S. is not addressing the challenges of the growing markets, and the remedial steps needed to grab a larger share of the pie.

In Japan, after concluding the highly publicized, government-supported very large-scale integration development program, companies have continued working together and have started a Japan Software Association.

In other areas, the nation is far advanced with its use of fiber optics in wired cities, and has also developed 512K read-only memory.

Fujitsu has associations with Amdahl Corp. and with TRW in this country, and Japanese components have obtained a reputation for high quality.

In Europe, Siemens bought Threshold Technology, a U.S. company active in voice recognition; Philips pioneered the work on the videodisk, and there are such things as Viewdata, the British Post Office's attempt to package data bases for public consumption.

France has coined the term "telematique" that treats telecommunications, information systems and electronics as an integrated unit, and has em-

barked on its Antiope project that aims to put a terminal in every home by the end of the

electronics scene? Wasserman listed four reasons:

- The U.S. companies are

CW at Wescon/80

decade.

Wasserman said the French are moving so fast we won't recognize France in three years.

And the UK has, among other projects, earmarked \$125 million for a program to increase management awareness of microprocessors.

Germany is known for its cooperative ventures between government, industry and universities and also for its complex robots.

In all, the European Economic Community is developing as a coherent whole that accounts for the production of one-third of the world's consumer, DP and office equipment, Wasserman observed.

Why isn't the U.S. taking a more active role in the world

focused on business within the U.S.

- U.S. industry is technology-driven. "If in doubt, introduce a new product" regardless of whether it is what the market wants or needs.

- Government constraints, generally viewed as antagonistic.

- U.S. companies tend to ignore social responsibilities such as automation's effects on unemployment.

"These attitudes were prevalent in the '50s. They weren't disastrous, but now could be," Wasserman commented.

The challenge can be approached by various routes:

- Develop market focus — ask what does the customer want?
- Deal with foreign owner-

ship in the U.S.; work with the foreign companies to mutual advantage.

- Develop government support, for example, via lobbying.

- Be able to thrive in an environment of short product lifetime.

Management must be more flexible, and take more risks, he added.

Wasserman listed six steps the government should take to fortify the electronics industry, although there was later debate with others preferring government help via tax incentives rather than direct aid.

Wasserman advocated the government subsidize research and development, revise antitrust laws, increase export financing, institute investment credits, decrease taxes for individuals living abroad, and establish trading companies along the European model.

Upton is editor of EDP/Industry Report, an International Data Corp. Publication.

New Companies

Worldwide Software Associates, Inc. has been formed to provide marketing and technical support for a variety of computer software products. The international firm is located at Suite 301-S, 2625 Butterfield Road, Oak Brook, Ill. 60521.

composition equipment. It is located at 24 Pinecone Lane, Southboro, Mass. 01772.

Spur Products Corp. has formed a consulting company to help print circuit board and

integrated circuit designers utilize the Calma computer-aided design system. The newly established Interactive Graphic Systems group is located at 1023 Fourth St., Santa Rosa, Calif. 95401.

K and S Data Services, Inc. has been established to provide computer services in the clothing and related industries. The company is located at 3535 S. Broadway, Los Angeles, Calif. 90007.

Information Integration, Inc. is the name of a consulting service formed to aid both manufacturers and users of text, data, voice and photo-

Datapro, DRI Join Forces On Data Base

DELRAN, N.J. — Datapro Research Corp. and Data Resources, Inc. (DRI) have started a joint project to offer subscribers on-line access to a data base providing product reports.

The project was designed to capitalize on Datapro's library of product information and DRI's on-line telecommunications network.

Although pricing and availability for the new service have not yet been determined, Datapro said users will be able to access the data base from portable or desktop terminals.

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Western Union Seen an Acquisition Candidate

NORWALK, Conn. — Although Western Union, Inc. has modernized its communications transmission system and reduced its dependence on the declining telegram business, the firm has not yet achieved the market success it needs to be safe from potential acquirers.

That is the conclusion of a report published by International Resource Development,

Inc., a market research and consulting firm, as part of its Directions Intelligence series on major companies.

Western Union's extensive communications network could be "a very attractive asset" to a major DP company seeking to become a significant factor in telecommunications, the report noted.

Over the past 15 years, the report noted, Western Union's

modernization efforts have allowed it to offer modern digital data and voice communications services.

However, the company's freedom in configuring novel computer/communications services has been somewhat constrained by government regulations.

The Federal Communications Commission's Computer Inquiry II decision and other liberalizations of telecommunications regulations raises the possibility that Western Union could become a very competi-

tive factor in the growing computer/communications services market, possibly through a joint venture, the study found.

However, there is also a strong possibility that, as the industry becomes less regulated, Western Union will become a more attractive acquisition target for DP companies that want to expand rapidly in the communications market.

The Western Union report discusses the development of the company's corporate expansion and diversification

strategy, its financial resources, possible new areas of expansion and diversification and the methods to be used — acquisitions, joint venture or internal expansion.

Besides Western Union, International Resource Development has done studies of such Fortune 500 companies as AT&T, General Electric Co. and IBM.

Further information on the report is available from the firm at 30 High St., Norwalk, Conn. 06851.

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Executive Corner

• Gary R. Long has been appointed vice-president and general manager of Talos Systems, Inc.

• Daniel Tierney has been promoted to the position of vice-president of product support and services at Amdahl Corp.

• Douglas Davidson has been named president and

chief operating officer of Display Data Corp. in Hunt Valley, Md.

• David Pava has been promoted to general manager of Byte Industries, Inc., and Bob Miller has been promoted from controller to secretary-treasurer, thus expanding the board of directors to four members.

• Larry Holswade has joined Plantronics/Santa Cruz, Inc. as vice-president of marketing and will assume both domestic and international marketing and product support responsibilities.

• James Vance has been elected vice-chairman of the board of directors of General Automation, Inc.

• Richard Farnival has been named vice-president of operations at Cylix Communications Network, Inc., where he will construct the satellite network and oversee its operations.

• James Ashbrook has been promoted to vice-president of

systems marketing for National Advanced Systems.

• James Bloom, former senior vice-president of manufacturing, has been elected by the board of directors to the position of executive vice-president at Documentation, Inc.

• David R. A. Steadman has been named president of Raytheon Data Systems, which produces intelligent terminals, minicomputers, word processing and microwave communications systems.

• Charles Weiss has been appointed vice-president of information systems at Dataquest, Inc., a Cupertino, Calif., research and consulting firm.

• John D. Logue has been named vice-president of engineering at Datasystems Corp., manufacturers of line printer controllers for minicomputers.

• Dieter Heuer will assume the presidency of BASF Systems on Nov. 1 after major internal reorganization.

Expansions

Rixon, Inc. has purchased 13 acres and buildings adjacent to the home office and manufacturing plant at 2120 Industrial Parkway, Silver Spring, Md. 20904.

Cipher Data Products, Inc. has occupied its new 67,378-square-foot headquarters building at 10225 Willow Creek Road, San Diego, Calif. 92131.

Computer Pacific Corp. has moved into larger quarters in the recently renovated historic Arts Building in the heart of the financial district in Vancouver, Wash. Its address is Suite 300, 1104 Main St., Vancouver, Wash. 98660.

Standard Microsystems Corp. has opened a semiconductor facility in Hauppauge, N.Y. The six-acre site, valued at \$3.8 million, is called the Olof Hedquist Technology Center.

Datapoint Corp. has announced plans to expand its San Antonio, Texas, operations on a newly acquired 120-acre site. The multiyear project to consolidate the company's development and support operations is estimated to cost more than \$50 million.

Magnuson Computer Systems, Inc. has broken ground for a two-story, 64,000 square-ft building adjacent to its present headquarters in San Jose, Calif.'s Orchard Technology Park.

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Although Not a Technology Leader Prentice Carving Niche for Rapid Sales Growth

By Jeffery Beeler

CW West Coast Bureau
SUNNYVALE, Calif. — By its own admission, it is hardly the technological leader in its chosen field — short-haul data communications. Several of its most important competitors — particularly Codex Corp. and Paradyne Corp. — long ago left it in their technological wake.

Nor does it boast a particularly envious financial and management track record. Six years ago, it was forced to file for bankruptcy after failing miserably in an attempt to strike out in a radically different market direction.

But despite its many apparent limitations, Prentice Corp. is entering the 1980s with its business hopes at perhaps its highest point in the firm's 11-year history.

Reasons for Optimism

The reasons for the company's optimism are myriad. First, as a supplier of short-haul data communications equipment, Prentice has had the good sense and fortune to pick the fastest-growing sector of the rapidly expanding networking field as its main area of market specialization.

During the coming decade, the market for short-haul data communications hardware is

expected to balloon by 50% per year, compared with an estimated 25% to 35% per year for the data communications business as a whole, according to Prentice's marketing vice-president William Myers.

As demand for short-haul data transmission equipment grows, so too will Prentice's anticipated revenues and earnings, Myers and his colleagues reason. This year, the company expects to gross about \$7.5 million, with a 10% after-tax profit, and during 1981 its sales are projected to rise at least 25% to reach or exceed \$10 million.

Another major reason for Prentice's optimistic business picture is that the company expects to incur only minimal research and development expenses through the rest of the decade, in striking contrast to many of Silicon Valley's other high-technology outfits.

"The basic framework of our product line for the next 10 years is already firmly in place," Myers explained.

"Through the 1980s, we expect to be developing few if any new products from scratch. Instead, we'll simply be modifying and upgrading our existing product line to accommodate new technological developments as they become available."

Prentice's intention to keep its current product line basically unchanged lies at the very heart of the company's guiding management strategy: to minimize its business risk by carving out a market niche that promises dynamic sales growth and yet at the same time demands only evolutionary product changes and thus scant R&D investment.

At the moment, Prentice's offerings can be grouped into three basic product categories: low-speed, Bell-compatible modems; limited-distance modems; and statistical multi-

plexers. Each of the categories accounts for roughly one-third of Prentice's total revenues, Myers said.

In none of its three major product areas is Prentice considered the U.S.' dominant vendor, either in technological sophistication or in sales volume — a fact Myers readily concedes.

But what Prentice lacks in product depth it more than makes up in product breadth. "We may not rank as the top vendor in any one area, but we're the only company in the

industry whose product line spans the entire spectrum of the short-haul data communications field," Myers boasted.

The breadth of Prentice's product line makes the company's offering peculiarly suitable for local-area distribution (LAD) networks, which are usually limited to a radius of 40 miles, and for "campus-type" networks, which are typically minicomputer-based and cover a radius of only two or three miles.

Success in either the LAD or campus-type network markets requires a product line that includes precisely the types of short-haul data communications equipment that Prentice offers. Because it holds the distinction of being the only company that embraces all three categories, Prentice feels it enjoys a distinct advantage over all the other contenders in its chosen field, Myers said.

To maintain that competitive advantage, Prentice will eventually have to enhance its existing product line to accommodate short-haul data communications protocols like Xerox Corp.'s Ethernet.

Specifically, the company will have to redesign its current products to accept emerging technologies like coaxial cable, radio frequency and fiber optics, all of which are likely to form the backbone of Ethernet-like facilities, Myers said.

Supershorts

National Semiconductor Corp. and Harris Semiconductor have reached an agreement on a cross-licensing arrangement to cooperatively produce integrated circuits for the telecommunications market.

Vector Graphics, Inc. plans to expand its nationwide marketing campaign. The increased support and sales thrust will be aimed at domestic dealers, OEMs and systems houses.

Burroughs Corp. has formed an energy/utility marketing group for the New England area. The Boston-based outfit will focus on utility-related customer service and program products.

Compuscan, Inc. has sold its marketing and manufacturing rights for its Start, Comap and Scandisk graphic arts products to Electronic Information Technology, Inc., a new company formed and staffed by former Compuscan employees. Reporting substantial fiscal-year losses, Compuscan intends to concentrate on its optical character recognition business as a principle recovery strategy.

Edward Uhl, chairman of the board of Fairchild Industries, and Mason Phelps, president of VSI Corp., announced that their companies have executed a definitive merger agreement. The agreement is now subject to governmental review, normal closing conditions and shareholder ratification.

Three of the largest distributors of Ohio Scientific hardware, Cybertronix, Tek-Aids and Tri-Comp, have established Software Federation, Inc. to distribute software to the Ohio Scientific community.

A study by Gnostic Concepts, Inc. shows U.S. production of fiber-optic data links will advance from about \$20 million in 1980 to \$392 million in 1990. Over one-third of this production, \$7.4 million in 1980, will be by independent producers for the available market.

3M Co.'s Business Products Group has granted division status to the 3M Business Communication Products Department. The newly created division markets a variety of facsimile products including the 3M 9600 facsimile transceiver.

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ITT Software Center Guides In-House Professionals

NEW YORK — Its increasing internal use of computers has caused International Telephone and Telegraph Corp. (ITT) to establish a software center. The center provides policy guidance, training and control for the 6,000 software professionals employed by ITT, the company chairman Rand V. Araskog recently told security analysts here.

"We recognize software utilization as the technological challenge of the future and are mobilizing to meet it," Araskog told a luncheon session of the New York Society of Security Ana-

lysts, Sept. 18.

Also in ITT's long-range thinking the company, now strong in telecommunications, intends "to be a leader in semiconductors, in component technology, in connectors, in fiber optics, in digital equipment and displays, the chairman, president and chief executive said.

Araskog also predicted a positive financial picture for 1980, including improvement in ITT's European consumer electronics operations. ITT has a \$6 billion order backlog for telecommunications equipment, he said.

Foreign Orders & Installations

The Bridlington College of Further Education in the Humberside area of Yorkshire, England, has expanded its program of commercial computing courses with the recent installation of a Univac V77 minicomputer and five UTS 10 display terminals. The college now offers an on-line, dial-up service to neighboring schools that are already

equipped with communications terminals.

Quebec Telephone recently became the 10th division of GTE, Inc. to install the ASI-ST data management and report writer system, under a contract between GTE Data Services, Inc. and Applications Software Inc.

Orders & Installations

Fleetguard, Inc., a division of Cummins Engine Co., has ordered a computer system valued at more than \$1.2 million from Univac.

United Services Automobile Association has ordered more than \$4 million in dispersed data processing equipment from Datapoint Corp.

Systems Associates, Inc. of Charlotte, N.C., has ordered 100 Trident disk drives from Century Data Systems, Inc.

The Nassau Library System in Uniondale, N.Y., has installed the Mini Marc Automated Cataloging Resource System, developed by Informatics, Inc.

Standard Gage Company, Inc. of Poughkeepsie, N.Y., has ordered mini-computer systems valued at \$1 million from Univac.

The Colony Beach and Tennis Resort in Sarasota, Fla., and the Mansion on

Turtle Creek in Dallas recently installed Encore Lodging Systems, Inc.'s The Performer office system, which runs on Datapoint Corp. hardware.

Ford Motor Co. has ordered Prime Computer, Inc.'s 450 and 550 systems for a pilot computer graphics program at its research and engineering facility in Dearborn, Mich.

Central Michigan University has installed a Control Data Corp. Cyber 172 computer system, the first large-scale computer at the school devoted exclusively to student use.

Avantek Inc. of Blue Bell, Pa., has ordered \$1.2 million worth of Univac computer equipment, including the 1100/60 system and Unis software package, to be used for manufacturing control and financial applications.

Microform Data Systems has signed a contract with Security Pacific National Bank for a computer-assisted records management system.

Nickels & Dimes

Cullinane Corp. has filed a registration statement with the Securities and Exchange Commission covering an offering of 275,000 shares of common stock that will be offered for the company's account.

\$55

Modular Computer Systems, Inc. announced that trading in its common stock commenced on the New York Stock Exchange on Sept. 17. The company is concurrently redeeming all of its \$9.1 million principal amount of 8½% junior convertible subordinated debentures due July 1, 1994, at a re-

demption price of \$1,020 for each \$1,000 debenture, plus \$24.56 of accrued interest. Debenture holders can sell their holdings through brokers or convert them into the company's common stock on or before the close of business Oct. 13.

\$55

Advanced Micro Devices, Inc.'s board of directors has approved a two-for-one split of the company's stock. Newly issued stock will be distributed by the semiconductor firm in October to all shareholders of record as of Sept. 22.

ALA to Hold 1981 Meet in Dallas

DALLAS — The Association of Legal Administrators (ALA) is planning to hold their 1981 conference here on April 1-4, enabling vendors and other industry representatives to come face-to-face with key administrators from successful law firms.

ALA sponsors report that much of the exhibition booth space is already booked.

Additional information on the ALA event is available from their headquarters at 1800 Pickwick Ave., Glenview, Ill. 60025.



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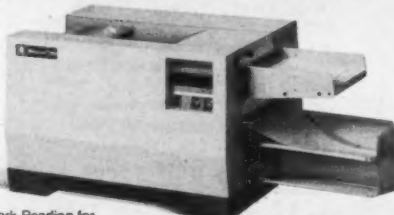
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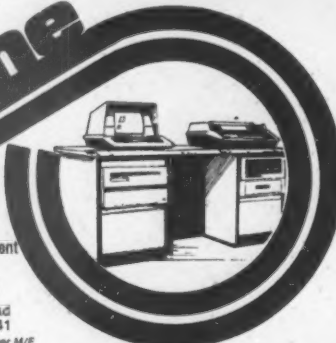
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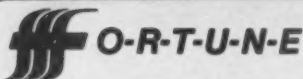
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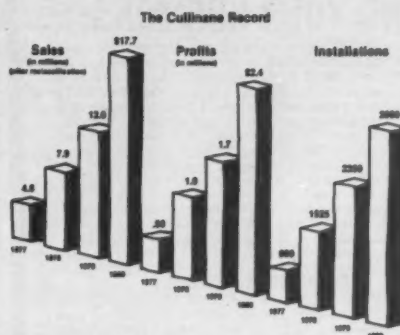
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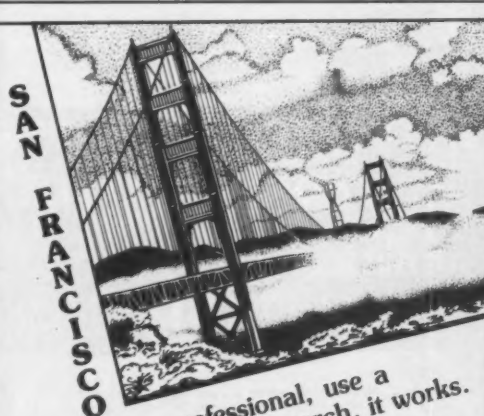
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To assist in the definition and development of large systems integration tests, BS/MSCS with knowledge of MVS, DOS and Pascal preferred. VSI knowledge highly desirable.

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Call 405/231-2403 or send resumes to: Okla. City, Personnel, 201 Channing Square, Room 8A, OKC 73102, Attention: Nevada Carter.

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The major responsibilities are to direct the activities of a staff of systems and application programmers in the design and implementation of administrative systems, system software, and academic and research applications; direct the installation and program development of interactive terminals for administrative, academic and research utilization and participate in the policy making and allocation of computer resources of the center. Installed system is IBM 370/148. Qualifications include a Bachelor's degree, work experience in COBOL, programming management and expertise with interactive hardware and software, preferably CICS. For full consideration send resume and salary history, prior to October 15, 1980, to Computing Center, Fort Hays State University, Hays, KS 67901. FHSU is an Equal Opportunity, Affirmative Action Employer.

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Send resume to John Miner, World Vision, 919 W. Huntington Dr., Moorville, CA 95026.

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Amherst, N.H. 03031
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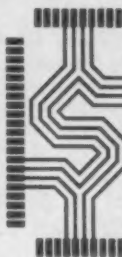
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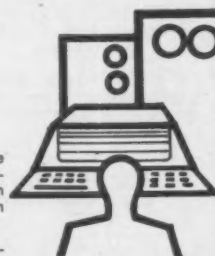
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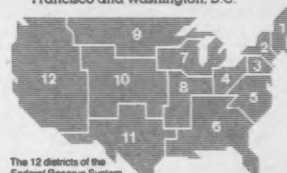
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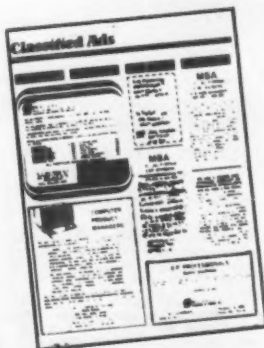
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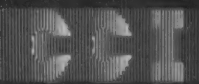
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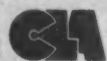
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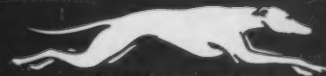
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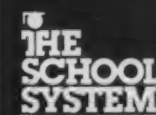
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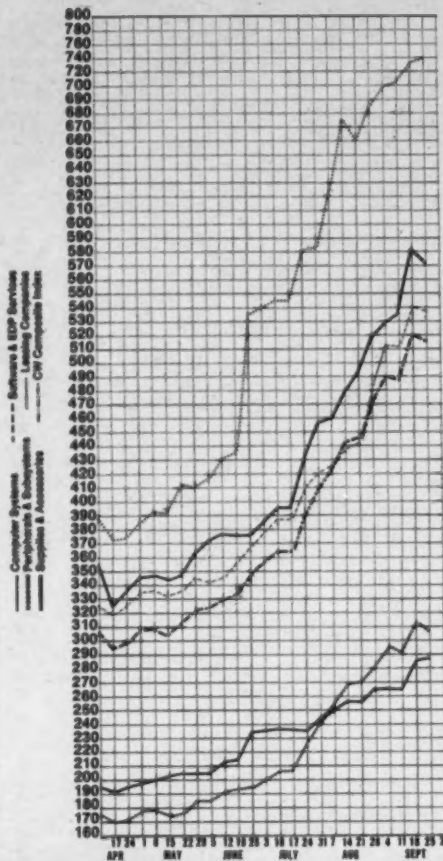
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CLOSING PRICES WEDNESDAY, SEPTEMBER 24, 1980

All statistics compiled,
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E A N	1979-80 RANGE (1)	PRICE				E X C	1979-80 RANGE (1)	PRICE				E X C	1979-80 RANGE (1)	PRICE				
		SEP 24 1980	CHNGE	WEEK NET	WEEK PCT			SEP 24 1980	CHNGE	WEEK NET	WEEK PCT			SEP 24 1980	CHNGE	WEEK NET	WEEK PCT	
COMPUTER SYSTEMS																		
A AMRAD CORP	15-42	30 1/2	-2 7/8	-8.9		D ADVANCED COMP TECH	1-6	4 1/2	-1 1/4	-21.7		A DATA ACCESS SYSTEMS	6-17	15 1/8	-1 1/8	-6.9		
N BURROUGHS CORP	60-88	84 7/8	-4 1/8	-5.6		D ANACOMP INC	3-20	18 1/8	+ 5/8	+3.5		A DATA PRODUCTS CORP	11-33	31 5/8	+1 5/8	+9.4		
D COMPUTER AUTOMATION	9-27	22 1/2	-2 1/2	-10.0		D ANALYSTS INTL CORP	5-9	7	0	0.0		D DATUM INC	2-4	3 3/8	- 1/4	-5.8	+10.0	
N CONTROL DATA CORP	38-74	74	+2 7/8	+6.0		A APPLIED DATA RES.	6-21	19 5/8	-1 3/8	-5.4		D DECISION DATA COMPUT	2-6	9 1/8	- 1/4	-9.6		
D CRAY RESEARCH INC	30-91	85 1/2	-5 1/4	-5.7		N AUTOMATIC DATA PROC	35-52	51 5/8	+3 5/8	+7.5		D DELTA DATA SYSTEMS	1-3	2 1/2	- 1/4	-9.0		
N DATA GENERAL CORP	66-87	76 1/8	+2 5/8	+3.5		D COMPUTER HORIZONS	1-9	4	0	0.0		N EDUCATION INC	7-27	27 1/4	-4 3/2	-2.9		
N DATAPoint CORP	44-88	83 1/2	-6	-4.5		D COMPUTER NETWORK	4-9	6 7/8	- 3/4	-2.5		D DATARISC CORP	5-31	11 1/8	+1 1/4	+10.1		
N DIGITAL EQUIPMENT	52-95	94 3/4	+9 7/8	+6.0		N COMPUTER SCIENCES	11-30	28 1/8	- 3/4	-2.5		N ELECTRONIC M & M	3-8	7 1/8	- 5/8	-7.9		
A EECO INC	9-20	18 1/2	-1 1/2	-7.5		D COMPUTER TASK GROUP	1-20	17	-2 1/2	-12.8		D EVANS & SUTHERLAND	21-72	69	+3	+6.5		
N ELECTRONIC ASSOC.	6-12	10 3/4	- 3/4	-6.5		D COMPUTER USAGE	2-10	8 1/4	-1	-10.8		D FABRI-TEK	1-4	3 1/4	- 1/4	-7.1		
N FOUR-PHASE SYSTEMS	20-49	30 3/8	+2 3/8	+8.4		D COMPUT AUTO REP SVC	4-19	9 1/2	- 1/2	-5.0		D GENERAL COMPUTEL SYS	1-6	5 7/8	+1	+20.5		
N FORBIO	31-55	52 7/8	-1	-1.8		D CONSHARE	11-21	18 1/4	-1 3/4	-6.7		D GENERAL DATACOM INC	12-27	26 3/4	+1 1/4	+4.9		
D GENERAL AUTOMATION	7-19	9	- 1/8	-1.3		D CULL INANE CORP	10-61	52 3/4	-2 1/4	-4.0		D GENERAL TERMINAL CP	1-4	2	0	0.0		
D GRI COMPUTER CORP	1-3	1 1/8	- 1/8	-10.0		D DATA DIMENSIONS INC	1-6	2	+ 1/8	+6.6		N HAZELTINE CORP	12-31	29 5/8	- 3/8	-1.2		
N HENLETT-PACKARD CO	44-78	78 3/8	+4 7/8	+6.6		D DATATAB	1-4	1	0	0.0		N HARRIS CORP	25-48	44 1/8	-1 1/8	-2.4		
N HONEYWELL INC	65-101	95	+1 1/2	+1.6		D DSI CORP	4-9	7 1/2	+1 1/8	+17.6		D INFOTEC INC	1-8	1	0	0.0		
D IBM	50-79	67 1/2	+1 1/4	+0.3		N ELECTRONIC DATA SYST	19-37	35	- 3/4	-2.0		D INFORMATION INTL INC	8-15	12 3/4	-1	-7.2		
D MAGNUSON COMP SYSTS	20-36	34 1/4	-1 3/4	-4.8		D ELECTRONICS INC	9-25	21 3/8	+7 7/8	+4.2		D INTEL CORP	45-95	89 1/4	- 1/4	-5.3		
N MANAGEMENT ASSIST	9-24	20	-1 3/4	-8.0		D ENSTE CORP	1-3	2 1/8	+ 1/8	+6.2		D INTERL	15-33	32 1/2	- 1/4	-0.7		
D MANUFACTURING DATA S	22-39	38 1/8	+ 1/8	+0.2		D IPS COMPUTER MARKET	2-4	3	+ 1/4	+9.0		A LUDY ELECTRONICS	4-12	10 3/4	0	0.0		
D MINI-COMPUTER SYST	2-6	3 3/4	- 1/4	-7.1		D KEANE ASSOCIATES	3-9	6 1/4	- 3/4	-10.7		D MSI DATA CORP	5-16	14 1/8	- 1/8	+0.8		
D MODULAR COMPUTER SYS	0-30	28	+2	+7.6		D KEYDATA CORP	2-5	2 1/4	0	0.0		N MINOLUX	10-39	14 1/2	-1 1/2	-9.3		
N NER	52-82	72 1/2	- 3/8	-0.5		D LOGICON	12-27	26 7/8	-1 5/8	+0.6		N P-AMK DATA SCI	10-20	25 3/4	-1 1/2	-5.5		
A PRIME COMPUTER INC	15-49	44 1/4	-2 7/8	-6.1		D MATHEMATICA INC	5-18	17	+1	+6.2		D OHEX	2-10	9 1/2	- 1/2	-5.5		
N PERKIN-ELMER	26-60	55 7/8	-3 5/8	-6.0		D NATIONAL DATA CORP	10-25	23 7/8	-1 1/2	-5.9		A PARADYNE CORP	10-50	45 5/8	- 1/2	-4.4		
N SPERRY RAND	42-60	52 7/8	- 5/8	-1.1		N PLANNING RESEARCH	18-62	53	-8 1/2	-13.8		A PERMUTICORP	9-18	11 1/2	- 1/4	-1.9		
A SYSTEMS ENG. LABS	11-45	42 7/8	-1	-2.2		D PROGRAMMING & SYS	1-1	3/4	0	0.0		D RANEX CORP	10-17	16 1/4	0	0.0		
D TANDEM COMPUTERS INC	13-56	52 3/4	-1 1/4	-2.4		D RAPIDATA INC	4-9	8 3/4	+ 1/8	+1.4		C RECOGNITION EQUIP	9-18	16 3/8	- 5/8	-9.9		
N TEXAS INSTRUMENTS	79-144	138 1/2	+3 3/8	+2.1		D REYNOLDS & REYNOLD	21-34	25	+2 3/4	+12.3		D SCAN DATA	1-5	2 3/4	- 1/4	-10.2	-2.4	
A WANG LABS.	17-60	56	+2 1/4	+4.1		D SSC INC	4-17	16 1/2	+1	+1.0		N STORAGE TECHNOLOGY	12-23	22 3/8	- 3/4	-3.4		
						D SCIENTIFIC COMPUTERS	6-27	25	- 1/4	-0.9		D SYKES DATA SYSTEMS	16-39	37 3/4	- 1/4	-0.6		
						N TYMSHARE INC	34-71	69 3/4	+1	+1.7		D T BAR INC	14-21	19	+ 3/4	+3.1		
						A URS SYSTEMS	5-15	13 3/4	- 1/4	-1.7		A TEC INC	3-8	6 5/8	- 1/4	-3.6		
						N WYLY CORP	4-18	16 5/8	-1	-5.6		N TETRADEX INC	42-78	65 3/4	- 1/4	-1.5		
LEASING COMPANIES																		
D BOOTH FINANCIAL CP	13-23	22 1/4	- 1/4	-1.1		PERIPHERALS & SUBSYSTEMS												
N COMSCO INC	0-18	16	-1 3/8	-7.9		N AN INTERNATIONAL	13-24	16 3/4	- 3/4	-4.2		A AMERICAN BUS PRODS	8-15	14 5/8	- 5/8	-4.0		
A COMMERCIAL GROUP CORP	1-2	2 1/8	0	0.0		N AMEX CORP	10-29	26 7/8	- 3/8	-1.3		D BALTICORP BUS FORMS	1-8	3/4	0	0.0		
A COMPUTER INVESTS GRP	2-4	2 3/8	+3 3/4	+46.1		A ANDERSON JACOBSON	9-18	17 1/4	- 1/8	-0.7		N BARRY WRIGHT	15-44	42 3/4	- 5/8	-1.8		
D CONTINENTAL INFO SYS	2-15	1 1/2	+ 1/2	+18.0		N APPLIED DIG DATA SYS	9-12	11 1/2	- 1/8	-2.1		D CYBERMATICS INC	11-18	15	+ 1/4	+1.6		
N DATACORP RENTAL	2-4	3 5/8	- 3/8	-5.9		D AUTO-TROL TECHNOLOGY	18-62	53	-8 1/2	-13.8		A COMPLEX PRODUCTS INC	11-18	15	+ 1/4	+1.6		
A DCL INC	3-6	3 1/4	+1 1/4	+8.3		D BEHIVE INT'L	3-17	15 3/4	-1 1/8	-6.6		N ENNIS BUS FORMS	13-21	19 1/4	+ 1/8	+0.8		
N DRI INC	5-12	7 7/8	-1 1/8	-1.5		A BOLT-BERANEK & NEW	12-33	33	+5 1/2	+20.0		N 3M COMPANY	46-63	60 7/8	- 5/8	-1.0		
N ELEC	11-15	2 1/8	- 1/8	-5.5		N BUNKER-RAND	17-41	39	+ 1/4	+0.6		A MOORE CORP LTD	16-37	37	- 3/8	-9.8		
A LEASAPAC CORP	1-2	5/8	0	0.0		D CAMBRIDGE MEMORIES	1-9	3 5/8	- 3/8	-9.3		N NASHUA CORP	20-35	28 1/8	-1 3/4	-9.8		
D PLEASER TEX CORP	2-4	2 7/8	- 3/4	-20.6		N CENTRONICS DATA CUP	20-55	52 7/8	-2 5/8	-7.3		D STANDARD REGISTER	22-35	33 1/4	+3 1/4	+10.8		
N RELIANCE GROUP INC	24-79	78 3/8	- 3/8	-1.0		A CETEC CORP	3-7	6 5/8	- 1/8	-1.9		A TAB PRODUCTS CO	13-31	30 1/2	- 3/4	-9.4		
N U.S. LEASING	12-23	22 1/4	- 3/8	-1.6		D COMPUTER DEVICES INC	5-10	8 1/4	-1 1/4	-13.1		N TASHI MAGNETICS	11-18	15 7/8	-10.3	-10.3		
						D COGNITRONICS	1-7	6	- 1/2	-7.6		N WALLACE BUS FORMS	23-45	45 1/4	+3 3/4	+9.0		
						D COMPUTER COMMUN.	4-10	6 7/8	- 3/4	-9.8								
						D COMPUT CONSOLES	0-29	21	-2 1/4	-9.6								
						D COMPUTER TRANSCIVER	1-5	3	0	0.0								
						N COM-UTERVISION CORP	2-9	9 1/2	+3	+3.0								
						D COMARC CORP	13-25	19 7/8	- 5/8	-3.0								

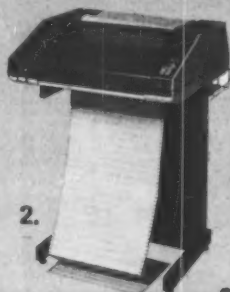
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4. **The B-300/B-600.** SSI's 300 and 600 lpm Band printer systems are the latest impact technology. Low-cost and easy to maintain, the Band is a user's economical answer to increased output. PDP-11 and NOVA 4 users particularly are turning to the Band.
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- ☐ The 2550 (1500 lpm Charaband)
- ☐ The 2200 Family (300, 600, 900 lpm drum)
- ☐ CT-1200 Family (600, 1000, 1200 lpm ChainTrain)

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